OCTOBER 1956

plating

JOURNAL OF THE AMERICAN ELECTROPLATERS' SOCIETY

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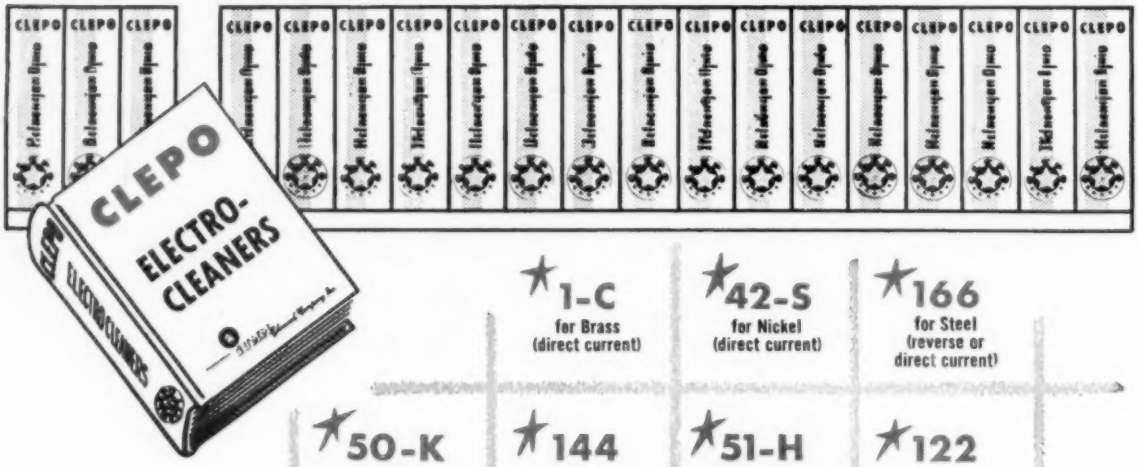

★1-C
for Brass
(direct current)

★42-S
for Nickel
(direct current)

★166
for Steel
(reverse or
direct current)

★50-K
for Zinc Base
Die Castings
(reverse current)

★144
for Steel
(reverse or
direct current)

★51-H
for Zinc Base
Die Castings
(direct current)

★122
for Brass
(direct current)

★43-R
for Copper
(reverse current)

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METAL FINISHING CLEANERS AND PROCESSES

ELECTROCLEANERS
that do a
Superior Job

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for Steel
(reverse or
direct current)

★177
for Steel
(exceptionally difficult
soil removal)
(reverse current)

★230-N
for Nickel
(tolerant to
chromic acid)
(direct current)

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While a multipurpose electrocleaner will give excellent results so far as general shop use is concerned, it may not be the best for any given job where a limited time cycle, special soil problem or other local condition demands peak performance.

Whether simple multipurpose or highly specific, CLEPO has the proper Electrocleaner. If our Field Service man can be of help in studying the problem and in selecting the cleaner, he is at your command. Call us, if your trouble is pressing and we'll expedite matters.

Electrocleaners are but one phase of our broad service to your industry. For more than twenty five years we have developed and progressively improved upon an extensive line of quality cleaners, strippers, aluminum finishes, tumbling barrel chemicals, deburring materials, etc. CLEPO can serve you well.

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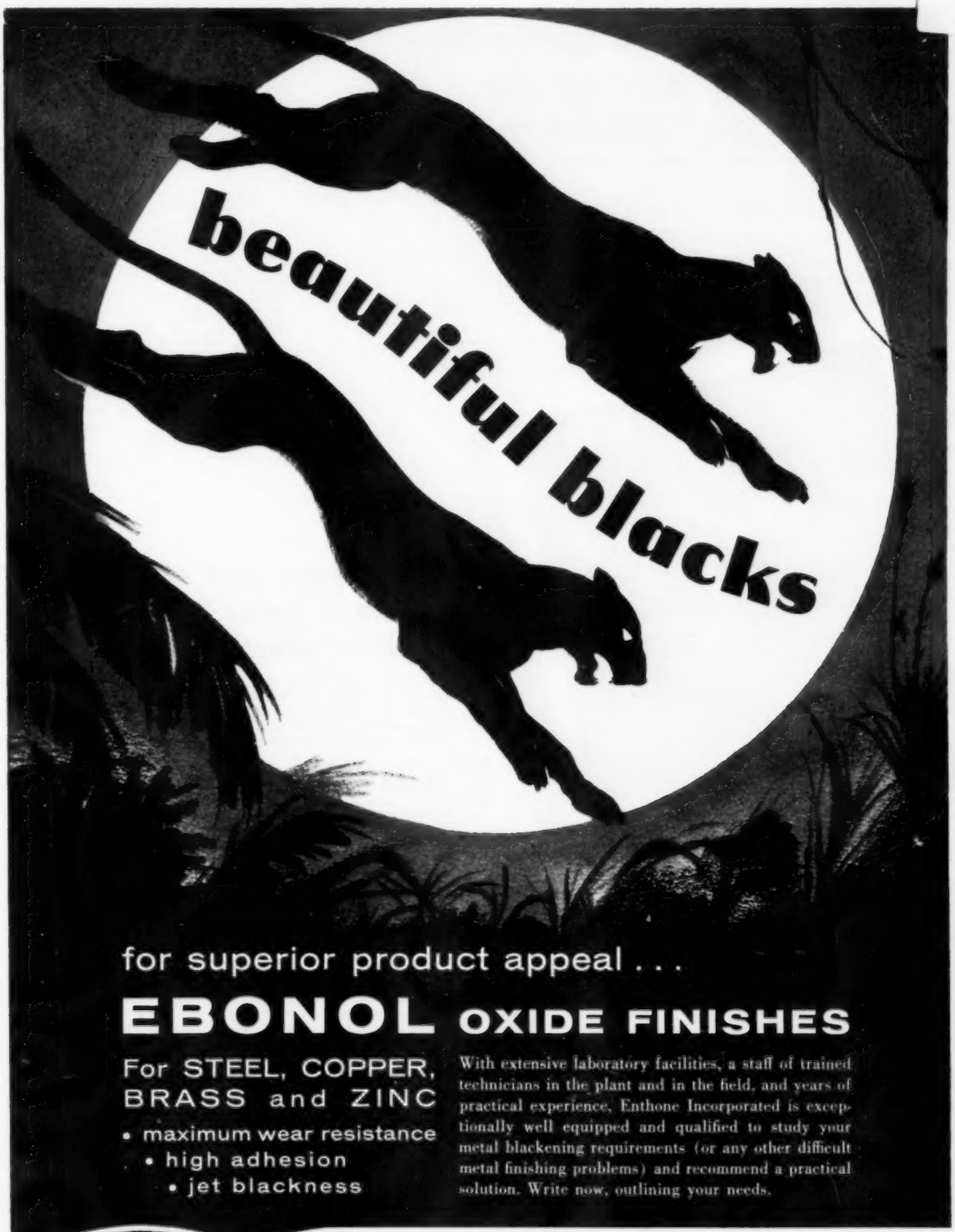

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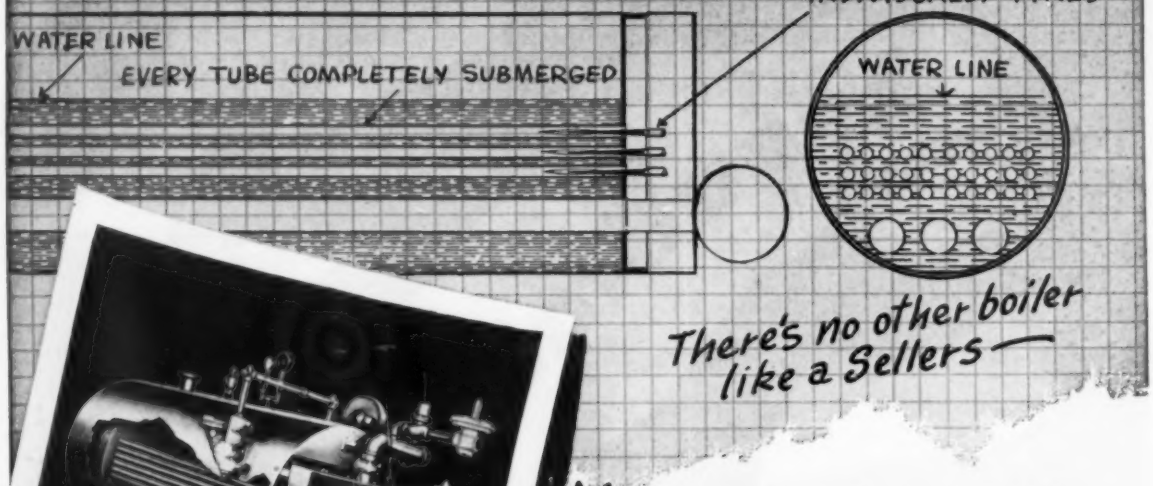
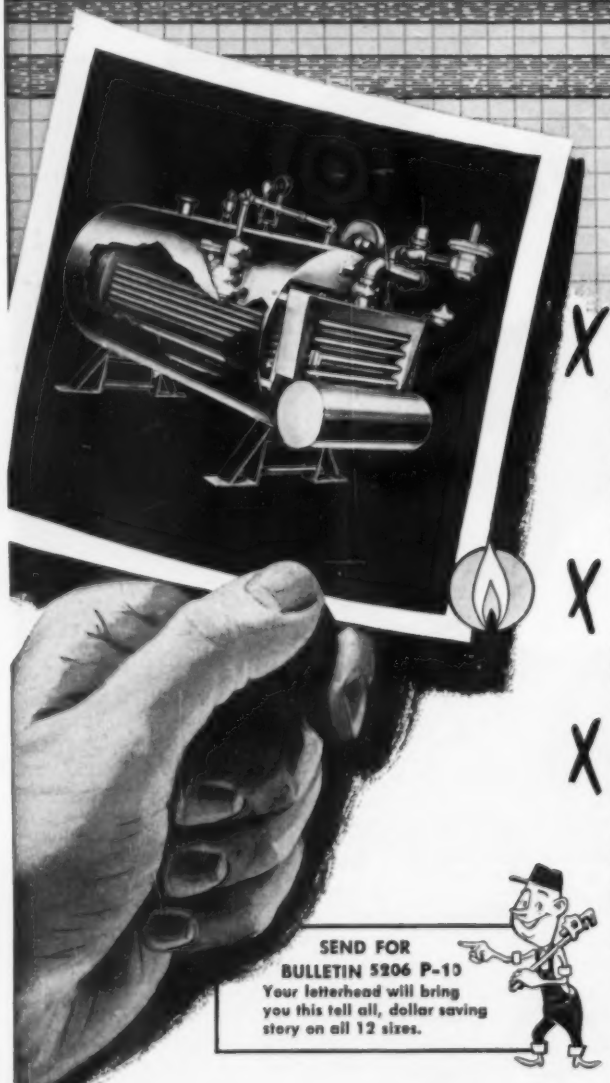
when you buy a steam boiler . . . be sure to look at the picture of a Sellers Immersion Boiler



There's no other boiler like a Sellers—



every square foot of heating surface is water backed— —100% effective!

The long, individually gas fired tubes in the Sellers Immersion Boiler are all completely submerged nearer the water level—and over the return tubes! Heat is therefore uniformly distributed through them—and directly into the water—no where else!

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There's no other steam boiler like a Sellers Immersion Steam Boiler. Its simple design gives you a package boiler unit with many other outstanding features. Minimum maintenance and maximum efficiency combine to give you years of remarkably low operating costs. Twelve sizes available!

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An Educational Society for the Advancement of the Science of Electroplating, the Finishing of Metals and Allied Arts

plating

Journal of the American Electroplaters' Society

October 1956 **Vol. 43, No. 10**

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Dr. Russel E. Harr
Editorial Board

Francis R. Murphy
Production Manager

Rodney Leeds
Advertising Manager

Lee F. O'Connell
111 N. LaCienega Blvd., Beverly Hills, Calif., OLympia 2-1313

William Ayres
Lee F. O'Connell Co.
233 Sansome St., San Francisco 4, Calif. YUkon 6-2981
Western Advertising Representatives

Published by the American Electroplaters' Society, Incorporated, 445 Broad Street, Newark 2, N. J. Phone: HUmboldt 2-3400. Yearly subscription for Members $2.00. Nonmembers U. S. and Canada $5.00, 65c a copy. Foreign, $8.00 a year, $1.00 a copy.

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PLATING is abstracted regularly in Chemical Abstracts, Metals Review, Metallurgical Abstracts, Engineering Index, Technical Data Digest, and Bulletin Analytique.

Statements of fact and of opinion given in articles and papers in PLATING are those of the contributors. The American Electroplaters' Society assumes no responsibility for them.

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Published monthly at 5800 N. Marvine St., Philadelphia 41, Pa. Entered as second class matter July 1, 1946, at the Post Office at Philadelphia, Pa., under Act of August 24, 1916

SOCIETY of BUSINESS MAGAZINE EDITORS

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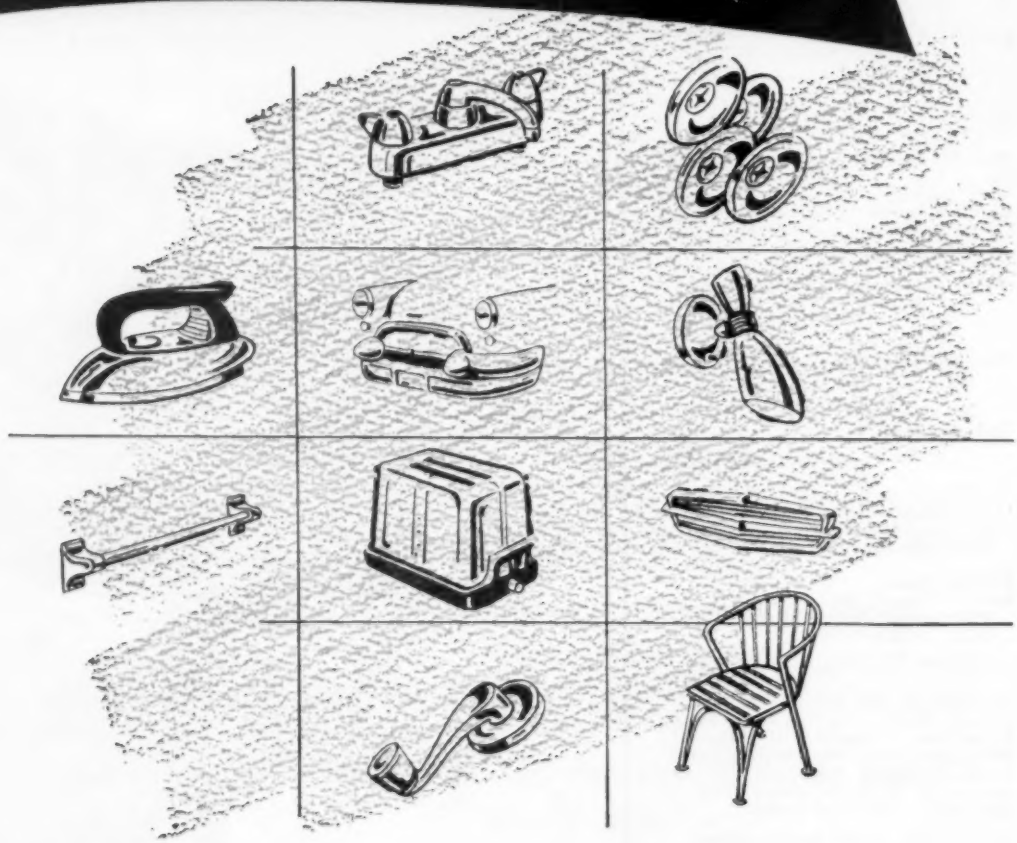
long, bright nickel plating operation without treatment



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EDITORIAL

TOOLS OF THE SUCCESSFUL PLATER

The present rapid development of techniques in the plating industry requires that channels of communication between men in the industry be kept open and direct.

He who is isolated, through lack of foresight on his own part or that of his employer, will soon lose much of his potential value. The successful man is the one who knows what is happening and what is going to happen in his industry and who can plan for tomorrow's requirements while he does today's work.

There are a number of channels for communication of technical information, such as journals, books, and interviews with salesmen. But most direct are the technical societies. Aside from their publishing activities they have a very special function—bringing together people who have complementary experiences and who speak the same language. On a small scale, this takes place in the local branches of the American Electroplaters' Society and on a larger scale at the National Conventions.

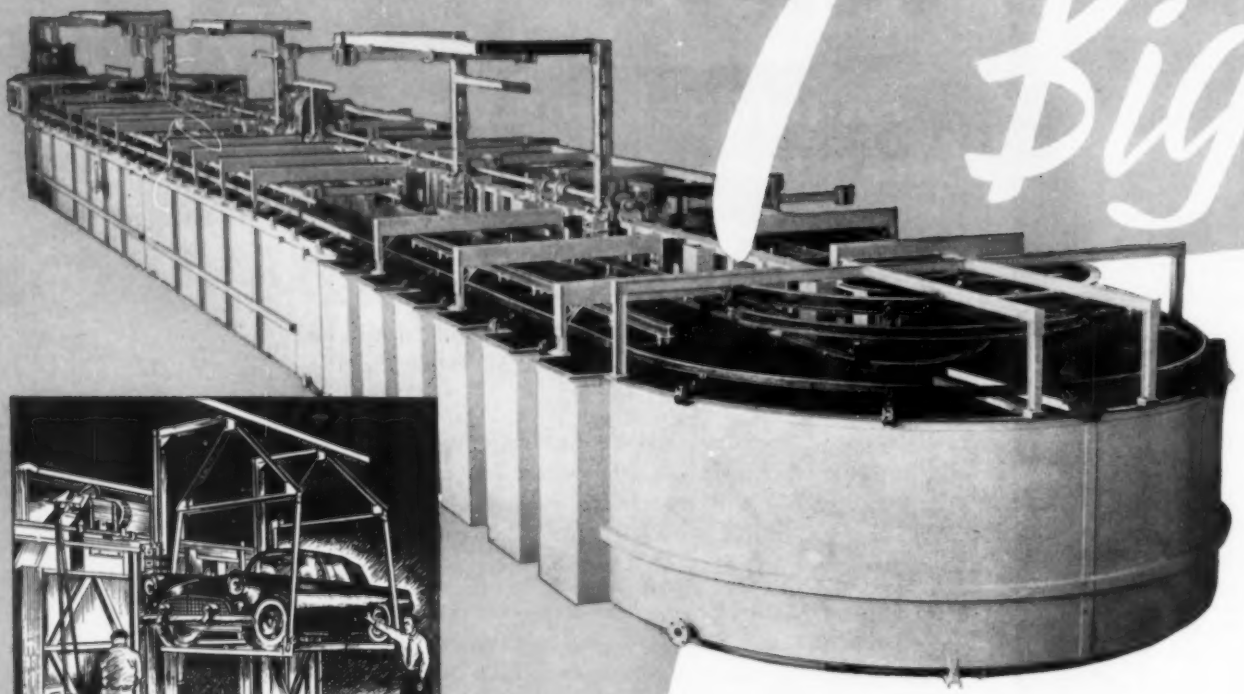
In the American Electroplaters' Society are brought together people of varied interests: the scientists, the engineer, the supply house representative, and above all the production man. Its program centers around that typically American concept of "know how" which is the basis of efficient production and the lack of which stimulates new developments. Its local Branch meetings, its Annual Conventions, and the Industrial Finishing Expositions which it sponsors furnish an unequalled opportunity, formal and informal, for exchange of ideas which may be adapted to individual needs.

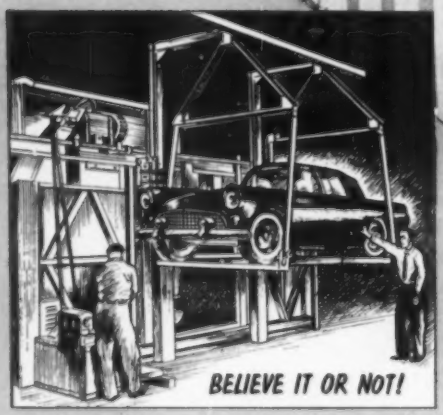
Herberth E. Head

2nd Vice-President

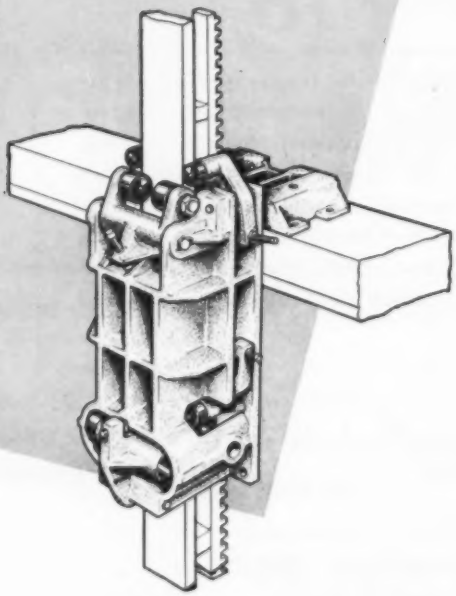
7 Big

This 113' pre-enameling machine was running (dry cycling) four days after delivery! Capacity is 100 100-lb. racks per hour. Overall height of arms is *only* 13'.





The Wagner Automatic Plating Machine Lifts 3200-pound Ford Thunderbird easily!



Typical pre-assembled single station elevator housing ready for installation over jig-drilled holes in main carriage. Note adjustable roller brackets.

- Increased Load Capacity
- 100% User Adjustability
- Simplified Installation
- Reduced Maintenance
- Practical Flexibility
- Improved Plating Quality
- Lower Production Costs

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Advantages!

IN THIS WAGNER STANDARD PRECISION AUTOMATIC!

Of course, you don't use your plating machine as a car hoist. But this proof of the dynamic lift capacity of the precision Wagner Automatic means that deflection under normal loads is minimum. Excessive strain on alignment mechanisms is eliminated, wear and downtime reduced to the vanishing point. Precision adjustments of critical transfer members can be made by untrained personnel—including the main lift boom, carrier lift angle assemblies and carrier rail support brackets. Maintenance is easy, as standard gear racks and pinions are used throughout the entire elevator mechanism, (capacity can be increased 50% by substituting our heavy duty rack). Positive lubrication is provided to each hardened roller—or central lubrication may be installed, at low cost.

Here's how we cut costs of installation, servicing—even later alterations. All details are interchangeable, precision drilled and machined, preassembled. Machines may be lengthened or shortened for long term production changes; parts and entire assemblies, even sections, may be replaced. Every part is drilled, reamed, tapped and milled in special co-ordinated fixtures; sections are assembled in giant jigs and are designed for foolproof self-aligning. A single hydraulic power unit interconnected to two hydromotors with micro adjustment of acceleration and deceleration permits work carriers to be lifted, transferred and deposited gently without loss of parts.

This revolutionary, precision electroplating machine is a big subject. Please send for our technical bulletin and learn all the facts—or call our representative in your area. He'll study your problems and assist in every way to achieve better plating at lower costs.

CHEMICALS, ANODES, AND EQUIPMENT

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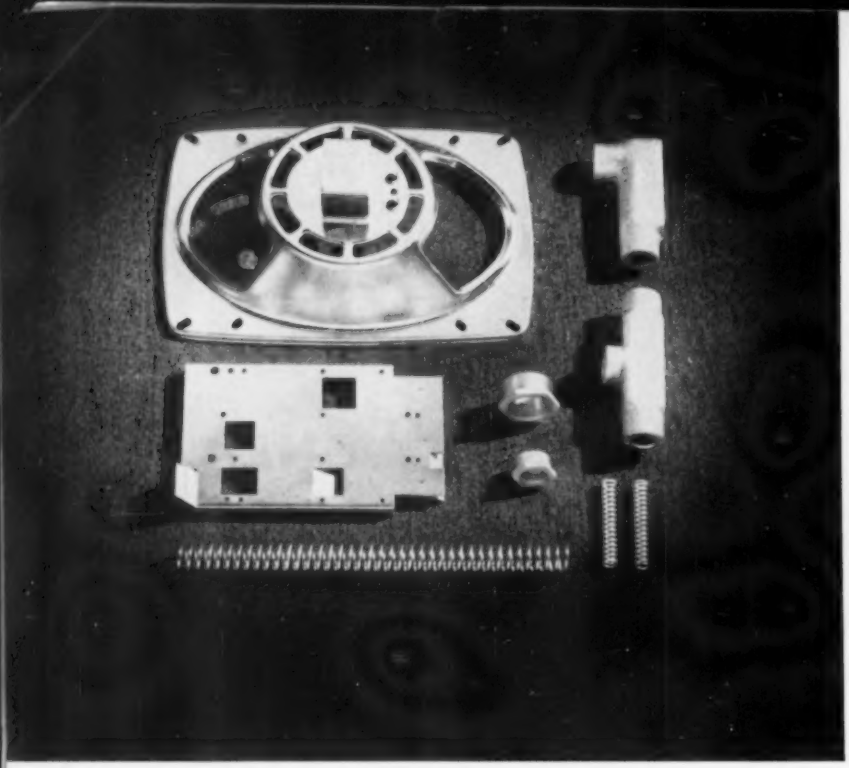


A FINER CADMIUM PLATING PROCESS by UDYLITE

Bry-Cad Process Gives a Faster and Brighter Cadmium Finish

Newly developed by Udylite research, Bry-Cad offers many interesting applications for cadmium plating.

Springs—Bry-Cad provides excellent protection with a minimum of hydrogen embrittlement.

Electronic Assemblies—Bry-Cad's low electrical contact resistance is highly desirable on assemblies put together with fasteners. An excellent surface for rapid soldering.

Malleable Iron Castings—Bry-Cad gives unusual coverage not obtainable with similar rustproofing finishes.

Stainless Steel Aircraft Parts—Bry-Cad does not cause embrittlement of stainless steel parts subjected to high temperature.

Udylite Bry-Cad has other advantages such as: High cathode efficiency, simplicity of operation and control, attractive finish with less tendency to finger mark, a self-lubricating metal and good resistance to mild alkalies. Bry-Cad is easily adapted to plating in barrels, hand operated tanks, semi-automatics or full automatic machines.

The Udylite Bry-Cad process is just one of the many electroplating processes pioneered by Udylite. Whether your need is for a process, equipment or supplies—be sure to consult your Udylite representative or fill out coupon and mail to us direct.

THE Udylite CORPORATION
DETROIT 11, MICHIGAN

WORLD'S LARGEST PLATING SUPPLIER

(Advertisement)

METEX FILTER AID

The rate of flow and clarity of the solution after it passes through a filter is greatly dependent upon the type of filter aid used in the filtering process. After hours of actual use and testing in the Udylite laboratories the Udylite Corporation recommends Metex Filter Powder to users of filter aids.

Metex Filter Powder contains no soluble matter to dissolve in the plating solution causing roughness of the plated deposit. The uniform interlocking fibers of the filter cake hold tightly to the filter cloths, plates, stones or screens regardless of the pressure applied, yet are readily removed when required. Due to the type of filter cake formed, cloth filter bags remain in their original soft pliable condition rather than becoming hard and cracked.

Metex Filter Powder is very economical. For example when used with the Udylite-Detroit 3-1000 Filter which has a rated flow of 1000 gallons per hour only one and one-half pounds is needed. With the Udylite-Detroit 1-350 Filter only one-half pound is needed. Of course, the amount of filter aid to be added to any batch type purification depends upon the amount of contamination to be removed. Usually there is added to the solution to be purified an equal amount of filter aid and carbon. If carbon and permanganate are used, an amount equal to their combined weights is added. In filtering a cyanide solution, a quantity equal to carbon and sodium sulfide or any other material used for the purification treatment is added.

In addition to the amount added to the solution to be purified, additional Metex Filter Powder should be added at intervals or continuously so as to create a new membrane on the original coating. When filters are not equipped with automatic filter powder feeders, a quantity of filter powder equal to approximately 20% of the original precoat charge should be added at the intake of the filter every three hours. For continuous filtration, approximately four ounces of filter powder per day per 100 gallons of solution should be added at regular intervals.

ROUND LEAD ANODES

Round Lead Anodes by Udylite show increasing popularity month after month as compared to flat lead anodes. Sales increases are nation wide and not confined to certain specific areas.

The simple shape of Round Lead Anodes provides the greatest active plating surface area. The heavy cross-section withstands high current density without overheating. Less current is needed. Corrosive chromate buildup usually found on the side of the anode facing the tank lining is greatly reduced assuring an even anode wear. Warping, long a problem in chrome

(*Advertisement*)

plating, is eliminated by the use of Round Lead Anodes with their heavy cross-section.

Round Lead Anodes by Udylite offer economy to the user. Fewer anodes are required and with Round Anodes the entire circumference is conductive, resulting in better current distribution. You also get the maximum number of plating hours per anode. Cleaning is much easier to accomplish.

All Round Lead Anodes supplied by Udylite are completely fabricated of newly mined virgin tin and lead eliminating selective corrosion caused by foreign metal inclusions. The anodes are extruded, providing a dense non-porous structure.

Round Lead Anodes are furnished in two standard hook sizes. 4½ inches or 6½ inches to meet varying anode rod sizes. Plastic coated hooks can be furnished if desired. All hooks have knife edged contacts. Shipment of hooks are made in specially designed wooden cases to assure delivery of straight unmarred anodes.

FORGED-COPPER BALL ANODES

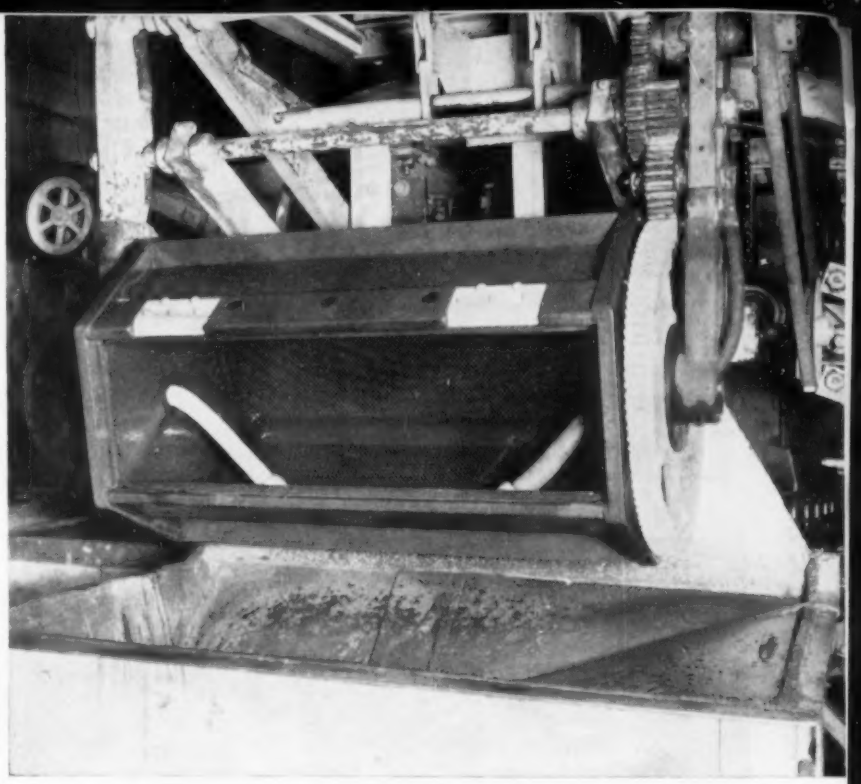
To Electroplaters who have not used Forged-Copper Ball Anodes in their copper plating process, we urgently suggest they make this test for comparison purposes.

Udylite has many price conscious customers, who after trying forged ball anodes, will use no other type. They say the price differential is more than overcome by other advantages.

The Udylite Forged-Ball Anodes are made from virgin metal. They are 99% pure copper. Here are some of the reasons for their superiority in copper plating. They eliminate oxide inclusions and anode sludging which give a rough plating finish. Copper deposits are smoother because forged anodes corrode more smoothly and uniformly. There are fewer rejects and therefore the operating economy is greater. The extra smooth deposit assured by the use of Udylite Forged-Ball Anodes means easier buffing on all work.

Forged-Copper Ball Anodes makes an ideal fine grained undercoat for nickel and chrome and assures denser deposits so essential in copper plating used for selective carburizing. You will find, too, that Forged-Copper Balls produce consistently excellent results with Bright Cyanide Copper where smoothness of deposit is of utmost importance. This is particularly true in the plating of die castings.

Forged-Copper Ball Anodes by Udylite combine all the well-known advantages of the ball shape, *plus* fine uniform grain structure. They can be shipped immediately from stock at any of nine conveniently located warehouses.



THE BEST BARREL CYLINDER EVER MADE

After 13 Months Of Three-Shift Usage This Udylite Tempron Cylinder Shows Little Wear

This unretouched photograph shows a Udylite Tempron Barrel Cylinder which has been in use for thirteen months, most of the time in a "round the clock" operation. This cylinder looks like new.

Seams are tight and there is no warping although it has processed thousands of heavy loads of work through a complete cycle of *electro-clean, acid pickle, zinc plate, bright dip* or *dichromate* and *hot* and *cold rinses*. Most of these loads have been beyond our guarantee of 200 pounds per 14″ x 30″ cylinder.

In January, 1955 and after two years of exhaustive tests, Udylite formally introduced the Tempron Barrel Cylinder as the most efficient and long lived plating barrel ever offered. The vitality of Tempron and the durability of Udylite construction has now been convincingly proven in hundreds of operations.

During a recent twelve month period, a set of Udylite Tempron Barrel Cylinders has processed millions of pounds of work, mostly through the complete zinc cycle. Any measurement of wear is almost impossible.

Udylite Tempron Cylinders withstand, even under load, the highest temperatures used in plating. Withstand stronger acids. Have greater resistance to abrasion and can be used through the entire plating cycle.

Let us tell you more of the advantages of Udylite Tempron Cylinders or show you "on the job" examples. Write us today.

THE Udylite CORPORATION
DETROIT 11, MICHIGAN

WORLD'S LARGEST PLATING SUPPLIER

OCTOBER 1956 INDICATE A 1007.

INDUSTRY NEWS

Circo Doubles Production and Engineering Facilities

Alter Acquires Additional Area

Flood-Proof Buildings for Lea

Lea Expands—The Lea Manufacturing Company, Waterbury, Conn. is now operating the third section of a large new plant they are building on Aurora Street. The new location consists of 14 acres and offers a rail siding plus large truck docks for better shipping facilities. Adequate room was available to design the building for more efficient operations in addition to providing ample parking facilities.

Building No. 1, erected in 1948, was designed principally as a storage unit for raw materials used in the manufacture of Lea Products and for chemicals and equipment of other manufacturers for which Lea acts as a distributor.

Building No. 2 was completed in 1951 and is now used for the manufacture of Learok, Liquabrade, Lea Copper-Glo, other Brighteners and Special Chemicals.

Recently, the Company completed and is now occupying a large extension to Building No. 2. This area is now devoted exclusively to the processing, packaging and handling of its well known greaseless abrasive composition, Lea Compound. It has special storage facilities for the ingredients going into the greaseless abrasive compounds and a refrigerated room for keeping the finished compound under optimum conditions. It has modern shower, washroom and locker facilities.

All buildings in the new and expanding Lea plant are one-level units with floors at truck level height, about 3½ feet above ground level. Buildings have reinforced concrete foundations with cinderblock curtain walls and steel trussed roof. An excellent test of the construction came in the disastrous flood that hit the Naugatuck Valley last summer. Caught right in the middle of this raging torrent, the buildings stood up magnificently. While the company sustained some inventory loss, there was little damage to the buildings.

The 4th and last project in the building plans consists of a large office and research building. Completion is planned in 1957.

Plant Expansion—Doubling of production and engineering facilities at the Rahway, N. J. plant of Circo Equipment Company has been completed, Melville Morris, Circo president announced recently. A rapid increase in the sale of degreasers, metal parts washers and ultrasonic equipment has made this expansion necessary.

The original plant, with 24,000 sq ft of space, was built only four years ago. The newly completed expansion will be utilized immediately due to the growth in demand for Circo products. A feature of the expanded plant is its unique materials handling section which will allow for production and erection of all types of degreasers, washers and complete finishing systems. The engineering and business offices are now fully air-conditioned with a modern ventilating and heating system throughout.

Melville Morris also announced the formation of Circo Cleaning & Finishing Equipment Corp., as a wholly owned subsidiary of Circo Equipment Company. The new firm was created to fill the growing need for metal parts washers, power spray washers, dryers, ovens and complete finishing systems.

The new firm will design and construct custom-planned installations of all sizes, from the smallest conventional parts washers to multi-unit, fully automated systems which have integral washers, dryers and paint units.

Alter Buys Davenport—As the initial phase of its three million dollar expansion program, officials of the Alter Company, Frank R. Alter, president, Arant H. Sherman, executive vice-president, Bernard Goldstein, secretary-treasurer, have concluded negotiations for the purchase of all of the physical assets of the Davenport Besler Corporation. The purchase involves 42 acres of property and 213,000 sq ft of building space.

Presently, the world's largest manufacturer of secondary nickel alloys, Alter Company is installing in the new location additional electric furnace facilities for the production of master nickel alloys and its present capacity will be increased by 400 per cent.

In addition, the company has purchased the largest scrap baling press ever manufactured. This installation will hydraulically compress three complete automobiles in 90 seconds and will be a major source of open hearth steel scrap in the nation.

Alter Company's scope of operations is world-wide and presently both nickel alloys and steel scrap are shipped by this local industry to consumers throughout the world.

Officials of the company have indicated that many yet undisclosed features of the expansion program will be installed at the new site of operations within the next twelve months.

CHROME PLATERS and ANODIZERS

Specialists in quality chromium plating and anodizing have learned that Chromic Acid bearing the Mutual label assays consistently better than 99.75% CrO_3, while the sulfate content is negligible. Baths prepared with this acid may be used with confidence on the most exacting jobs.

For Chromic Acid—as well as other Chromium Chemicals—insist upon the Mutual label. Prompt shipments from Mutual's Baltimore Plant or from dealers' warehouse stocks throughout the United States and Canada.

CHROMIC ACID SODIUM BICHROMATE
POTASSIUM BICHROMATE

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ALLIED CHEMICAL & DYE CORPORATION
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Reliable Brass Plating

●

Reliability is something most people now take with cynicism. It is most popular to make sweeping claims for performance and assume that the user will not expect materials to do as well as the ads say.

●

Brass plating is something of the same idea. Most people are looking for a panacea that by one magic addition will solve all their troubles. The books and magazines are full of statements some of which are true and some not.

●

We have written a new bulletin on brass plating. If you are a regular customer you've probably gotten one in the last month. If not write in for a copy. It's written so you can understand it and it's accurate. We can't of course put all our knowledge into four pages and our customers have the benefit of our wide experience on those unusual problems that make life so miserable. It costs no more to use True Brite materials and we've taken a load off your shoulders. Drop us a line and ask for the new bulletin on brass plating and prices on our brass materials. We make copper and zinc cyanide and this is our way of selling them.

●

Maybe you've got a problem we can help with.

TRUE BRITE CHEMICAL PRODUCTS CO.
P. O. Box 31 OAKVILLE, CONN.

INDUSTRY NEWS BRIEFS

● **Metal Hydrides Inc.,** Beverly, Mass., has awarded to **Badger Manufacturing Co.,** Cambridge, Mass., a contract for all equipment design engineering work necessary for the construction of Metal Hydrides' new $5 million sodium borohydride plant. The new plant is expected to be in production by early summer, 1957; it is part of Metal Hydrides Inc. recently announced $13.6 million prime government contract.

● **Kaiser Aluminum & Chemical Corp.** is centralizing its industrial and trade advertising activities with the establishment of an industrial advertising group at its general sales headquarters in Chicago.

● A unique opportunity for visitors to the 9th National Chemical Exposition to bring sample targets for corrosion-resistant coating will be offered by the **American Agile Corp.** at its booth (Number 1), during the week of the show, November 27 to 30, at Cleveland's Public Hall.

● The **Colorado Fuel and Iron Corp.** has moved its Philadelphia district warehouse and sales office to new and larger headquarters at 225 West Erie Avenue.

● After a four-year interval, the **Plant Maintenance & Engineering Show,** the eighth in the annual series, will be the largest in its history, with the number of exhibitors expected to pass the 400-mark, and the exhibit area the 100,000 square-foot mark. It will be held in Cleveland on January 28–31.

● **General Electric Metallurgical Products Department** workers in Detroit and Edmore, Mich., have received a 1 per cent cost-of-living boost in wages.

● The **Metals Division** in cooperation with the **Cleveland Chapter of Special Libraries Association** will once again have a booth at the National Metal Congress and Exposition in Cleveland, October 8–12, 1956.

● Increases of 10¢ to 40¢ per hundred pounds in less-than-carload prices of soda ash, caustic soda, bicarbonate of soda and modified sodas have been announced by **Diamond Alkali Co.**

● **Robert E. Ohaus,** program committee chairman, announces that final arrangements have been completed for the **Laboratory Apparatus and Optical Sections'** midyear meeting, November 7–10, to be held at The Homestead, Hot Springs, Virginia.

● Galvanizing problems were the chief topic of conversation when three representatives of **Nipon Steel Tube Company, Ltd.,** Kawasaki, Japan, recently toured the pipe making facilities of **A. M. Byers Co.,** Pittsburgh.

● Sales of the casting industry, turning out patterns for industrial parts, are estimated at $150,000,000. for 1956. This is an increase of $25,000,000 over 1955.

● There has been a cancellation of plans to add a sodium and chlorinated solvents unit to **Du Pont's Antioch Works.** After further detailed studies the company decided to cancel the addition for economic reasons.

A NEW ACHIEVEMENT IN SPRAY-CLEANING EFFICIENCY

JET CLEANERS

The JET series was developed to fill the need for economical, efficient, low-foaming spray cleaners to be used on zinc, copper, brass or steel.

- **JET CLEANERS step-up the efficiency of your spray cleaning equipment.**
- **Reduce overflow loss with new low-foaming formula (no silicones or troublesome chemicals), permitting wider range of concentration.**
- **Carry heavier dirt load without redeposition.**
- **Remove all types of soil.**
- **Are harmless to rack coatings and equipment.**
- **Non-toxic, dust-free, non-caking.**
- **Offer better results at lower cost.**

Remember — YOUR COST PER FINISHED ARTICLE IS THE TRUE COST OF YOUR CLEANER

Let the Northwest Cleaning Specialist explain JET CLEANERS' advantages in your production.

LO pH HI

NORTHWEST CHEMICAL CO.

9310 ROSELAWN DETROIT 4, MICH.

pioneers in pH cleaning control serving you since '32

INDUSTRY NEWS

Pilot Plant Lab

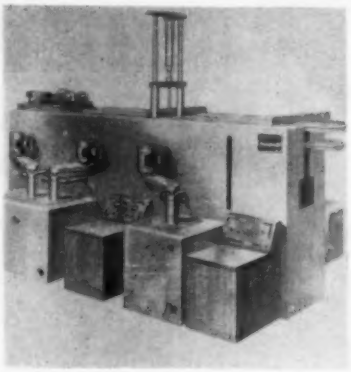
New Cleveland Plant—The International Rustproof Corp., of Cleveland, Ohio, manufacturers of rustproofing chemicals for industry, has moved to a new and larger location in the heart of Cleveland's industrial area. This new location comprises a four-story building which will house one of the most modern research and development laboratories in the industry, as well as the entire manufacturing plant for the production of rust preventives and corrosion solvents.

The new location at 1575 Merwin Avenue opened officially September first. All general and executive offices, air-conditioned throughout, will be located at this address. A new pilot plant laboratory has been installed, complete with conveyorized spray washers, dip tanks, and barrel units which will duplicate actual field conditions. This pilot plant laboratory was built to enable IRCO customers to prerun actual production parts for testing purposes. The new development laboratory, equipped with the latest machinery and production facilities, is designed with adequate space for expansion. All laboratory research operations are under the direction of L. D. Barrett.

Rampe Manufacturing Increases Space—Rampe Manufacturing Co., of Cleveland, Ohio, who manufacture a popularly priced and growing line of tumbling equipment announce that they are taking an additional 50 per cent of manufacturing space. The demand for their tumbling machines makes this necessary at this time. The additional manufacturing space is at the same address.

New Rep—The Meaker Company of Chicago has announced that the Platers Supply Co., of Indianapolis, Indiana is the sales representative for Meaker's products in the State of Indiana as well as the northern portion of the State of Kentucky.

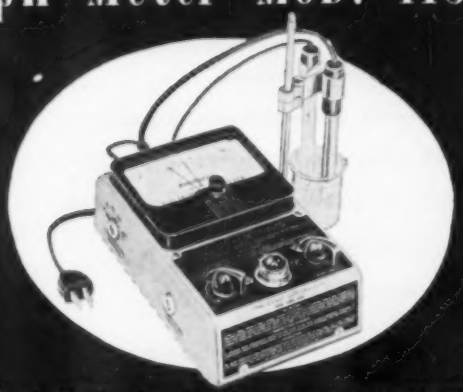
Ransohoff Shows Completely Automatic Ultrasonic Cleaning System—Visitors to the 1956 National Metal Exposition in Cleveland will have a chance to see a unique cleaning system in operation. Ransohoff, Inc., of Hamilton, Ohio, will present a completely automatic, 5-stage, Monorail Ultrasonic Cleaning System in Booth 2734.



Blind Hole Cleaner

To be demonstrated with actual production line parts furnished by well known Cleveland manufacturers, the machine will show how blind holes and difficult recesses of castings, engine parts, stampings, valve bodies and other parts can be cleaned perfectly.

PHOTOVOLT
pH Meter MOD. 115



A full-fledged line-operated pH Meter of remarkable accuracy at the unprecedented price of $125.- (complete incl. electrodes)

Write for bulletin #225 to

PHOTOVOLT CORP.
95 MADISON AVE. NEW YORK 16, N. Y.

Prompt Delivery
NICKEL ANODES

NICKEL SULFATE NICKEL CARBONATE
NICKEL CHLORIDE COPPER CYANIDE
All Plating Chemicals

Automatic Plating & Polishing Equipment

IRITOX
CHEMICAL COMPANY
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WAtkins 4-1977

Most versatile of all fully automatic plating and anodizing machines

LASALCO'S

New! *Cycleflex*

- Cycle changing requires no costly overhaul or rebuilding. Only the positions of pick-up heads need be moved, plus minor tank partition changes.
- New, simple electro-mechanical control and safety device eliminates all possibility of conveyor failure . . . makes it impossible to push racks into side of tank . . . prevents load from dropping if power fails during work transfer.
- Unusually low headroom required because no elevating mechanism operates above rack carrier.
- Self-cleaning heavy duty contacts have positive 3-point connection . . . need practically no attention.
- Easily removable rack carriers leave tank surfaces clear . . . an advantage in servicing and in manual plating of large pieces.
- Automatic loading and unloading of parts from standard double-spine racks is available . . . parts can be automatically unloaded while racks stay on machine.

Hydraulic operation, standard; pneumatic operation, optional.

Write For Brochure

LASALCO, INC.

HOME OFFICE: 2820 LaSalle St. • St. Louis 4, Mo. • PRospect 1-2990

IN TEXAS: 1113 Perry Road • Irving (Dallas), Texas • BLackburn 3-4921

INDUSTRY NEWS

Fuel Cell—The fuel cell, a battery that produces electricity from such gases as hydrogen and oxygen, is one of the many new devices under study at the new Parma, Ohio, basic research laboratories of National Carbon Co., a Division of Union Carbide and Carbon Corp.

When ultimately developed, commercial fuel cells may be used for reserve or standby power supplies, according to Dr. Robert G. Breckenridge, director of the new laboratories. Recent research indicates the possibility of making a battery which will obtain its energy entirely from gases such as oxygen and hydrogen.

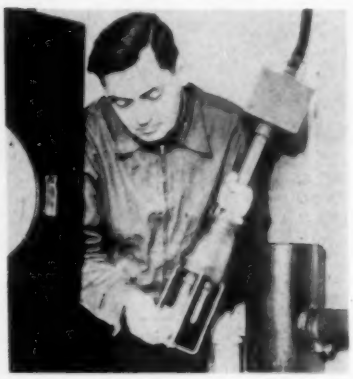
Dr. Breckenridge says a possible version would include two basic unit sections. One section would consist of layers of porous carbon and a liquid-paste caustic solution with a space between. Oxygen gas would stream into the space, and its molecules would move through the submicroscopic tunnels and channels in the porous carbon.

Gas Battery

When the molecules reach the caustic layer they form a film, and reactions take place which produce negatively charged particles. This is the electron-consuming or "positive" section of the battery. The other section, the electron-supplying or "negative" unit, is constructed in a similar fashion. It makes use of a stream of hydrogen gas which reacts to produce positively charged particles.

"Fuel cells will operate continuously, providing steady electrical currents as long as oxygen and hydrogen are fed into them," Dr. Breckenridge says. "They have many potential applications. For example, they would furnish auxiliary power in chemical plants where these gases are by-products of commercial processes. Fuel cells could also be used as power supplies for light buoys and remote stations which are expected to run for several years without attention."

National Carbon's new multi-million dollar laboratory in Parma, designed primarily for basic research in chemical and solid state physics, was dedicated September 18. It brings to seven the number of major research centers operated by divisions of Union Carbide and Carbon Corp., which in 1955 spent approximately $43 million on research.



Sampling

Checking Waste Effluents—Automatic recorders in specially designed trailers rove from plant to plant in the city of Charlotte, N.C., keeping a watchful eye on industrial wastes being discharged into sewer mains. The city's Water Department has two such trailers equipped to make 24-hour tests of plant effluents by continuous measurement of pH, flow rate, and total volume of flow. This mobile equipment, believed to be unique to Charlotte, includes one of the first installations of a new compact pH recorder manufactured by Leeds and Northrup Company of Philadelphia.

ULTRASONIC METAL CLEANING—BETTER, AT LESS COST!

Ransohoff

automatic indexing double monorail conveyor

with Bendix-perfected ultrasonic unit

Conveyorized Ultrasonic Cleaning System

"Scrubs with Sound" saves time, space and money

- Wash • Rinse
- Ultrasonic Cleaning
- Rinse • Dry

Combining an ingenious conveyor design with proven Bendix ultrasonics, the Ransohoff Conveyorized Ultrasonic System handles "impossible" cleaning jobs on an entirely automatic basis!

No part is too difficult to clean economically . . . regardless of blind holes and difficult recesses in castings, engine parts, valve bodies, etc. No part is too fragile to be thoroughly cleaned by this method.

The pictured 5-stage ultrasonic machine performs a complete cleaning job—fast and automatically. Operations include: wash, rinse, ultrasonic cleaning, rinse and dry.

For complete details of Ransohoff ultrasonic cleaning systems and other equipment, write **Ransohoff, Inc., 640 North Fifth St., Hamilton, Ohio.**

Ransohoff *An old name... the newest ideas*

INDICATE A 1014.

Reading

City regulations require that each plant discharging over 40,000 gallons a day have its effluent checked every 90 days. In addition, regardless of quantities involved, any corrosive mixtures detected at disposal plants have to be traced to their source and responsible plants notified. This test work has to be done for over 60 manufacturing plants with some 500 miles of sewer lines spread over an area of about 45 square miles.

The Record

By former manual sampling and checking methods, the city's Industrial Waste engineers faced a burdensome and time-consuming task. Furthermore, continued industrialization in the Charlotte area promised to intensify the work. The mobile trailers with automatic recorders were adopted to speed the checking job with a minimum of manpower.

Zinc and Cadmium Plating—To speed zinc and cadmium electroplating processes for industries in the Tri-State area, American Plating, Inc., has installed new automatic equipment at their plant in Zelienople, Pa. New automatic air operated hoppers and hot air drying equipment give American Plating an automatic "barrel-line" for fast and efficient bulk plating of such parts as nuts, screws, bolts, plugs and small stampings. According to the St. Louis manufacturer of this equipment, American Plating has one of only four such installations in the United States.

Harshaw Expands Overseas—The Harshaw Chemical Company of Cleveland Ohio has established a wholly-owned English subsidiary, Harshaw Chemicals Limited, with offices, manufacturing plant and laboratories at Waltham Cross, London, England. The new unit was formed primarily to supply electroplating chemicals and processes for British Isles. Other chemicals manufactured by the parent company are expected to be added as markets are developed.

Harshaw electroplating chemicals have been available in England through agents of L. van der Hoorn's Chemische-Technische Industrie, N.V. who have been operating under license at Utrecht for several years. The new unit will supplant these imports and speed up service for the local customers. L. van der Hoorn's will continue to expand their operations in Continental Europe. Another affiliate is Harshaw-Coiffe S. A., Limoges, France. This was established in 1954 to manufacture ceramic products for the chinaware, pottery, glass and tile industries.

School—The J.J. Siefen Company is happy to announce that the School of Spraying, first inaugurated in October 1954, has been widely accepted by the buffing trade.

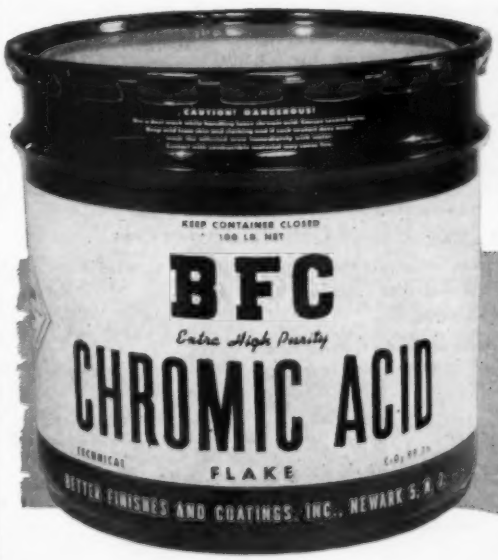
The School has been most beneficial when presented to the men who work directly with automatic buffing equipment and when presented in their plant.

Management has found it to be a major factor in helping to reduce costs in the Finishing Department.

Extra High Quality · 99.75% Pure

Clean Full-Weight Containers

Prompt Friendly Service



What more could anyone ask for?

Chances are you'll be very happy doing business with us. Next time you're in the market why not send us a modest order just to find out how good BFC Chromic Acid really is.

BETTER FINISHES & COATINGS, INC.

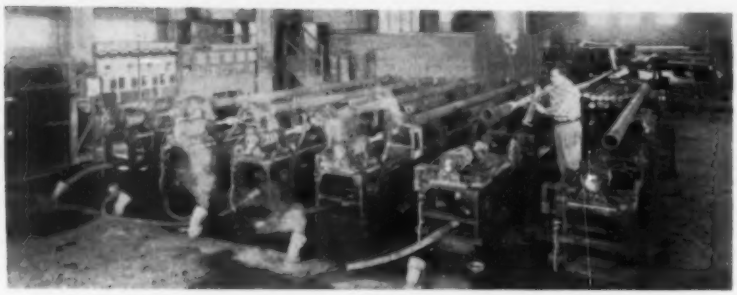
268 Doremus Avenue, Newark 5, N. J.

2014 East 15th Street, Los Angeles 21, Calif.

PAINTS · PLASTICS · CHEMICALS BFC

FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE A 1015.

INDUSTRY NEWS



Ni Cladding

Process Industries Hard Hit by Nickel Shortage—The tightening nickel market, which has affected virtually all industry, has been of particular concern to the process industries where nickel and high nickel alloy pipe lines and vessels play a vital part in corrosion and product contamination control. The situation has given great impetus to the continual search by the process industries for a material of construction with the advantages of pure nickel which would be readily available even in the face of government stockpiling of huge quantities of nickel.

One company which has been benefiting by the shortage-created market is the Bart Manufacturing Corp., Belleville, N. J. The Bart organization has been forced almost to double their production facilities in order to meet the greatly increased demand for their product. Utilizing only a fraction of the nickel required by nickel alloy materials, Lectro-Clad products are characterized by high strength, heat tolerance, non-porous corrosion and contamination resistant surface, and ease of field fabrication and repair.

Five hundred miles of Bart Lectro-Clad pipe was supplied to the government a dozen years ago, for use in Atomic Energy Development work. Since that time, most of Bart's production has been channeled to the AEC and other government agencies. Recently, in addition to necessitating increased production, commercial demand has led to the appointment of the Colorado Fuel and Iron Corporation as exclusive distributors for Lectro-Clad steel plate, and the Michigan Pipe Company (parent of the Saran Lined Pipe Company) as distributors of Lectro-Clad pipe and fittings.

New Barrel Finishing Compounds at NME—Three compounds recently added to the Oakite family of barrel finishing materials will be featured at Booth No. 941 at the National Metal Congress and Exposition, by Oakite Products, Inc., manufacturers of cleaning and metal treating compounds.

Oakite FM 183 is an alkaline abrasive type compound designed for the deburring of steel, stainless steel, and zinc die castings; Oakite FM 184 is an acidic compound designed to deburr, remove heat scale, and brighten steel, stainless steel, copper, and brass parts; Oakite FM 186 is an alkaline product designed to produce a brighter finish and better color on zinc die castings. Demonstrations of these materials will be conducted during the course of the Exposition.

Oakite will also feature Oakite Chromi-Coat, the new conversion coating for aluminum; Oakite Rinsite, the new rinsing additive that prevents spotting on plated work and prevents corrosion between finishing operations; and the Oakite Crys-Coat phosphating process.

New Southwest Agent—Contract Engineering Company of Denver, Colorado, has been appointed agent for Pennsalt Chemicals corrosion-resistant products. The company will represent Pennsalt in the mountain states area of Arizona, New Mexico, Colorado, Wyoming and West Texas.

It's still around, Sonny, but you can't see it. It's broken up too fine.

That's the way it is with oil, grease, drawing compounds, stamping compounds, and other soils removed from metal parts in a tank of . . .

Cowles NS SOAK CLEANER

No Scum on the cleaning tank to foul cleaned metal coming out. Clean it with Cowles NS Soak Cleaner and it *stays* clean.

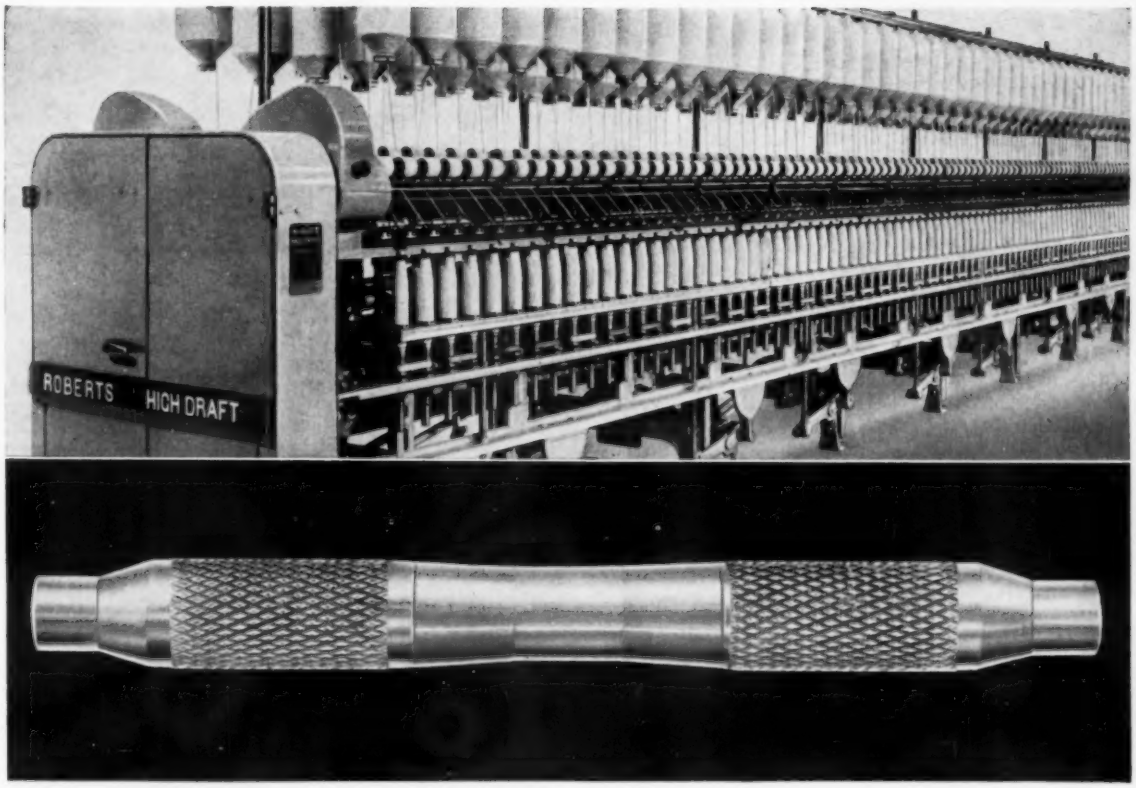
For more information about the emulsifying power of Cowles NS Soak Cleaner for *soak-tank* cleaning before plating, enameling, other finishing . . .

Send this coupon for Technical Bulletin.

Cowles Chemical Company
7018 Euclid Avenue
Cleveland 3, Ohio
Please send Cowles NS Bulletin
Name
Company
Address
City State

Cowles CHEMICAL COMPANY
Cleveland 3, Ohio

See Cowles NS and QC ad-vertisements on pages 1218 and 1232.



Roberts Co., internationally known textile machine maker

Improves finishes to 10 RMS... slashes costs $35.84 per thousand "top rolls"

Roberts Company of Sanford, N. C., specialists in spinning frames, was using polishing wheels and wire brushes to finish hardened steel top rolls—dry bearing components of its textile spinning machines. Costs were a high $39.40 per thousand finished rolls and the best finish obtainable by this method was an often unsatisfactory 50 to 60 micro inch.

A HONITE Field Engineer suggested that this company switch to the HONITE Barrel Finishing Method, using HONITE Compounds and HONITE Chips. The results: Costs per thousand finished top rolls immediately dropped to a low $3.56 . . . finishes improved to a high 10 micro inch *and* the life and lubrication requirements of the finished rolls increased a full 100%.

You can cut costs with the HONITE Barrel Finishing Method, too. Write today for full facts!

Honite® BRAND

Made in U. S. A. by
MINNESOTA MINING AND MANUFACTURING CO.
General Offices: St. Paul 6, Minn. In Canada: P. O. Box 757, London, Ontario. Export Sales Office: 99 Park Avenue, New York City.

3M COMPANY

MINNESOTA MINING AND MANUFACTURING CO.
Dept. FC-106, St. Paul 6, Minn.

☐ I'd like to talk with a HONITE Field Engineer
☐ Send me FREE copy of booklet "Facts and Figures Report on HONITE Barrel Finishing"

Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____

INDUSTRY NEWS

Another New Building—Gus J. Schaffner, Jr., Chairman of the Board of Directors has announced that Schaffner Manufacturing Company, Inc., Schaffner Center, Pittsburgh, Pa. broke ground for additional production space to manufacture their new Schaffner Metal Center Aircooled Bias (type) Buffs. The demand has been so great for these buffs that it is necessary to add an addional 15 thousand square feet to the present buffing compound and buff plant.

This new building will make the third building addition in the past year and a half for Schaffner Manufacturing Co., who produces a full line of buffs, polishing wheels and buffing compositions in all grades, sizes and types, including band bars and bars for straight-line automatic and curved bars for automatic buffing equipment.

Service Plan For Scientific Instruments—Scientific instrument users can now obtain a service and repair policy similar to the coverage purchased by many television set owngrs.

Under a plan announced recently, Chicago Apparatus Co., supplier of scientific equipment, will perform regular preventative maintenance and make immediate emergency repairs at no extra charge to the customer.

The plan is said to be the first in the scientific instrument field. It is designed to provide protection against breakdowns of highly complex apparatus which often controls thousands of dollars worth of production.

Under the new plan, periodic inspections of equipment will be made by Chicago Apparatus representatives who have undergone intensive training and been certified by instrument manufacturers. In addition, emergency work will be performed immediately.

Larger Headquarters—The American Zinc Institute, Inc., now occupies new and larger offices in Suite 2020 of the Lincoln Building, 60 East 42nd Street, New York 17, N. Y. The AZI phone number will remain unchanged.

According to John L. Kimberley, executive vice-president of the AZI, the Institute's new and expanded facilities will enable it to serve more efficiently and expeditiously those industries producing and using zinc and zinc coated products.

The American Zinc Institute, Inc., a non-profit organization, is the national trade association of the zinc industry. One of its major functions is the collection and distribution of information relative to the production and use of zinc and zinc-based alloys and compounds.

PROMAT DOES IT AGAIN !!

New **D-37 gives you a one-dip, bright chromate for less than 6¢ a gallon!**

USED IN SEMI OR FULL AUTOMATICS — BARREL OR RACK PLATING

IT'S A POWDER!

D-37 Chromate is a concentrated powder that you mix yourself. You don't pay freight on water.

NO LEACHING NECESSARY!

This power-packed concentrate of acid and chromate is a one-dip brightener. No other single dip chromate lays down as much chrome. The laying of chrome is in direct proportion to the time of immersion!

COSTS PENNIES A GALLON!

With D-37 you have no carboy inventory . . . nothing to hold or return. The cost of this new amazing chromate made up is but pennies a gallon.

MANUFACTURING PLANTS LOCATED IN THE CITIES BELOW

WAUKEGAN, ILL. PHILADELPHIA, PA. GARDENA, CALIF.

PROMAT A DIVISION OF **POOR & CO.**

851 S. Market St. Dept. P-10 Waukegan, Ill.

DISTRIBUTORS OF PROMAT'S GREAT LINE OF PROTECTIVE MATERIALS

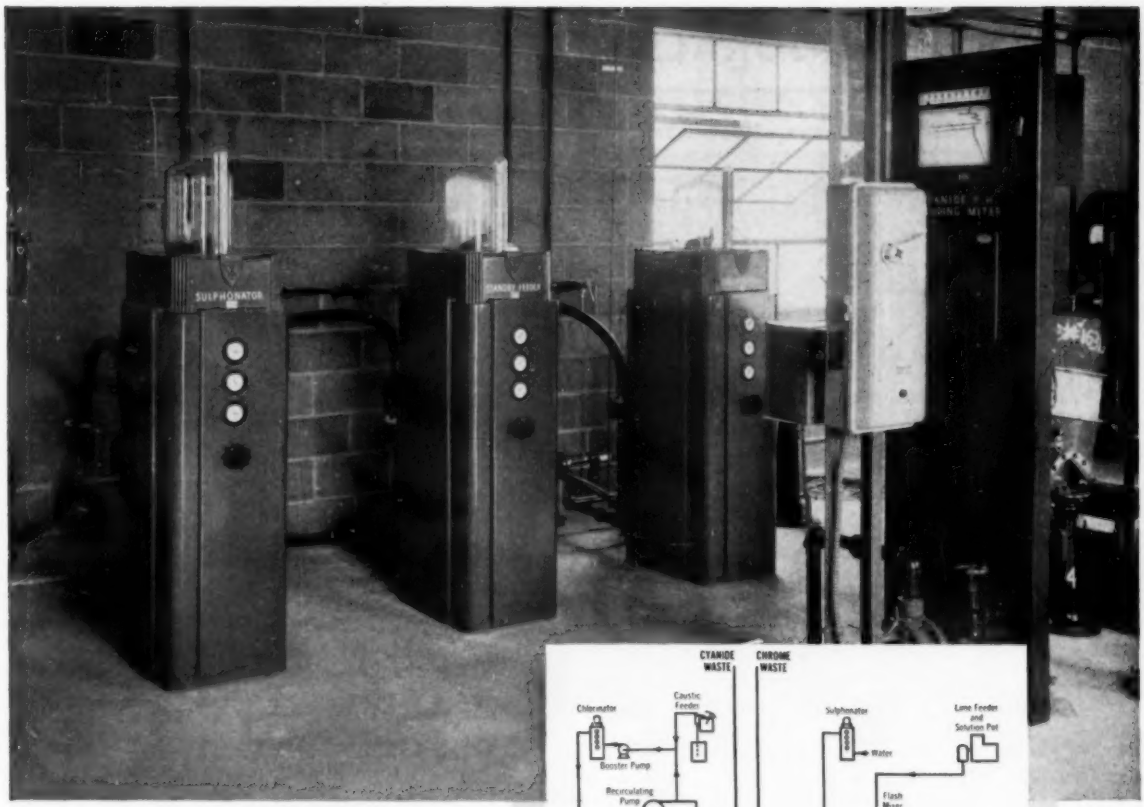
Baker Dist., Cleveland, Crown Rheostat, Chicago, Haviland Co., Grand Rapids, Mich., Loco Engineering & Sales, Los Angeles, LaSalCo., St. Louis, Munning & Munning, New York and Newark, The Reynolds Co., Philadelphia, F. H. Ross Co., Charlotte, N. C., John Swift & Co., Canton, Conn., Sundwork Co., Los Angeles, Gus Walgren Co., Grand Rapids, Mich., Bill Young & Co., Cincinnati.

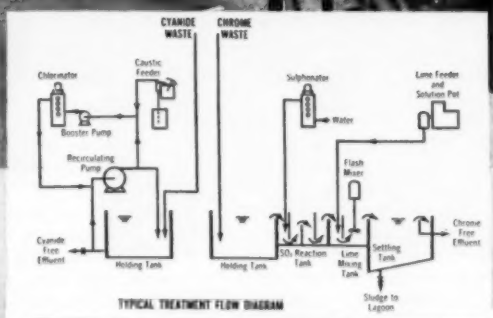
"PROMAT MEANS PROTECTIVE MATERIALS"

FREDRICK W. WAGNER

The vigorous career of Fredrick W. Wagner, 41, Vice-President of Wagner Brothers, Inc., came to an untimely end August 3, when his light plane crashed on a flight from Pontiac to the Wagner summer home at Higgins Lake. He is survived by his wife and six children, his mother, Mrs. A. T. Wagner, a sister, Mrs. George Domine and brother, Joseph R. Wagner, President of Wagner Brothers, Inc.

Fred was widely known and esteemed by the metal finishing world in which he had been active for twenty years. Originally part owners of the A. T. Wagner Co., founded by their father, the two Wagner boys gathered early sales experience in the plating and foundry supply business, then launched the Wagner Brothers Company in 1940. The infectious enthusiasm and vigor of the younger, Fred, balanced effectively with the comparative calm and conservatism of Joe Wagner. As the company began the manufacture of anodes, then plating equipment and later chemicals, the two-fisted but good-humored and always likable Fred became a symbol of the giant organization he helped to build and he leaves a mark the industry will not soon expunge. The loss to the Wagner family, the corporation and to the metal finishing industry is beyond calculation.





DAYSTROM INSTRUMENT DIVISION USES

W&T *Cyanide & Chrome Waste Treatment*

The Daystrom Instrument Division of Daystrom, Incorporated, located at Archbald, Pennsylvania, has provided a compact and efficient treating plant to destroy the toxic components of their plating waste. The treatment plant has been in continuous operation since 1953.

The cyanide bearing waste is treated with chlorine and caustic, using a W&T Water Diaphragm Chlorinator and a W&T Chemical Solution Feeder. The treatment breaks down the cyanide to harmless carbon dioxide and nitrogen gas components.

The chromium bearing waste is treated with sulphur dioxide and lime, using a W&T Sulphonator and a W&T Dry Chemical Feeder. The treatment removes the toxic chromium and other heavy metals from solution, to be disposed of as sludge.

If you would like more information on Wallace & Tiernan cyanide or chromium waste treatment, write for bulletin RA-2120-CP.

WALLACE & TIERNAN INCORPORATED

25 MAIN STREET, BELLEVILLE 9, NEW JERSEY

I-52

PERSONALS

Bernard Kumko and **John H. Sauntry** have recently been added as Wyandotte Chemicals representatives. Kumko will headquarter in Grand Rapids; Sauntry in Chicago.

Kumko is a chemical graduate of University of Virginia, served four years in the U. S. Navy, eight years as an electroplating chemist and has several years previous sales-service experience with the Parker Rust Proof Company.

Sauntry is a chemical graduate of Fairfield University, Connecticut, and has several years research and development experience with Reynolds Metals.

Sauntry

Kumko

Stephen J. Rudan has been appointed district representative in Southern Wisconsin of O'Donohue Sales Co., Milwaukee.

Rudan was sales and service representative for EKCO Products Co., Chicago, Ill., Processing Div. Rudan's new responsibilities will include the sales and servicing of metal cleaning and finishing installations to Wisconsin industrial plants.

F. E. Pringle has been appointed assistant general sales manager for The Howe Scale Co.

Pringle attended the University of Kansas, Illinois Institute of Technology and Northwestern University, and comes to Howe from Sperry Products, Inc., where for the past eight years he held sales and sales management positions.

Pringle

Rudan

Harold M. Priestley has been appointed to the metallurgical unit of General Electric Company's Materials and Processes Laboratory of the Large Steam Turbine-Generator Department.

Hanson-Van Winkle-Munning Co. has announced the retirement of **Allen T. Baldwin,** manager of the company's flux sales department. His retirement was effective June 30, 1956.

At the same time H-VW-M announced the appointment of **Warren H. McMullen** as metallurgist in charge of development, technical field and sales work in the company's No. 20 Flux and Fas Tin Flux programs. These programs are an important phase of H-VW-M's overall role as a leading supplier of metalfinishing supplies, processes and equipment. McMullen will carry on this work within the

McMullen

Baldwin

sales department but under the general direction of **Myron B. Diggin,** vice-president.

A veteran of 24 years with H-VW-M, Allen T. Baldwin is a leading authority in the fields of hot galvanizing and tinning techniques. His career at H-VW-M was devoted to developing new methods and techniques in these fields, with special emphasis on the development and use of flux.

Warren H. McMullen was graduated from Rensselaer Polytechnic Institute with BS degree. He then spent several years in the laboratory of a large appliance plant.

He joined H-VW-M in 1953, working in the company's laboratory on the metallurgy of all H-VW-M processes. In 1955 he began specializing in No. 20 Flux and Fas Tin Flux processes, studying these both in the company's laboratories and as a part of visits to customers' plants.

With this experience in the galvanizing and tinning fields, he brings to his new post valuable knowledge and experience to continue the technical development, customer service and sale of H-VW-M fluxes.

Kenneth R. Brown, vice-president and director of Atlas Powder Company, has has retired after 38 years' service.

Brown's pioneering work in developing the commercial production of sorbitol won him the 1955 honor awards of both the American Chemical Society's Division of Carbohydrate Chemistry and the Commercial Chemical Development Association.

J. M. Young has been appointed a sales representative for the Southeast territory, by the Leece-Neville Co., Cleveland.

In his new post, he will work with company franchise dealers in the states of Florida, North Carolina, South Carolina, Georgia, Tennessee, Alabama, and Mississippi.

Young was formerly associated with the Engineering Products Division of the Radio Corporation of America, Camden, N. J., Blue Magic, Inc., Philadelphia, and the Pioneer Stock Company of Philadelphia, a subsidiary of the Container Corporation of America.

Joseph Foster has been appointed manager of Brush Electronics Company's market research department.

Young

Foster

Prior to joining Brush, a division of Clevite Corporation, Foster was a market analyst for the Harris-Seybold Company. Earlier he had been director of product development for The Enamel Products Company.

Metalwash Machinery Corporation, of Elizabeth, N.J. announces the appointment of two new representatives in the Degreaser Division for degreasers, degreasing finishing systems, perchlorethylene driers, and degreasing solvents.

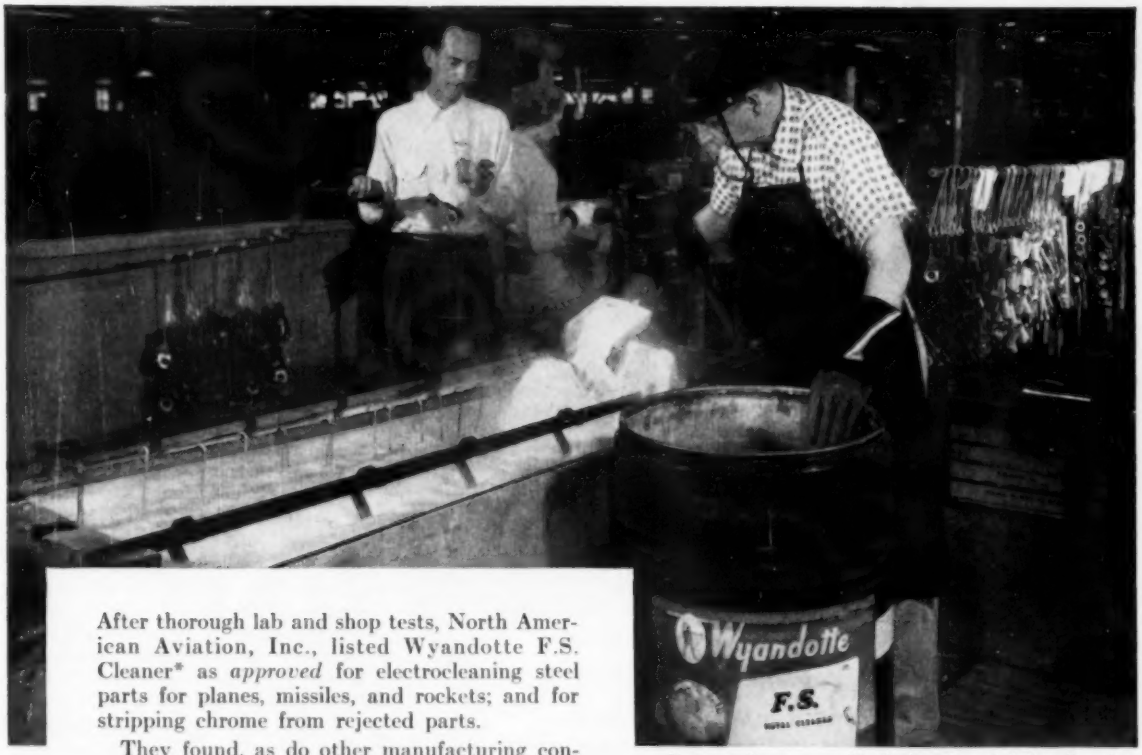
Howard F. Brennan, formerly a representative for Loftus Engineering Corp., will represent the Metalwash Machinery Corp., line of degreasers in Northern New Jersey.

Brennan

Harvey

J. W. Harvey, formerly sales manager for a midwest portable hydraulic tool firm will represent Metalwash for degreasers in the Chicago area.

North American lists Wyandotte F.S. as "approved" for electrocleaning steel



For over three years, North American Aviation, Inc., has used Wyandotte F.S. in their main plant in Inglewood, California, for all steel electrocleaning.

After thorough lab and shop tests, North American Aviation, Inc., listed Wyandotte F.S. Cleaner* as *approved* for electrocleaning steel parts for planes, missiles, and rockets; and for stripping chrome from rejected parts.

They found, as do other manufacturing concerns, that F.S. gives them product economy, long solution life, and outstanding cleaning ability.

Wyandotte F.S. Cleaner is noted for its exceptional detergency in removing smut, fabricating oils, and compounds. It features fast, complete wetting action, controlled foaming, and very free rinsing. In addition, it has high soil suspension ability, and is 100% soluble in water. Wyandotte F.S. may be the very electrocleaner you have been seeking for your metal-cleaning operations.

Let the Wyandotte representative show you the results possible with this and other quality metal-finishing products. Wyandotte Chemicals Corporation, Wyandotte, Michigan. Also Los Nietos, California. Offices in principal cities.

*Reg. U. S. Pat. Off.

Wyandotte CHEMICALS

J. B. FORD DIVISION

THE BEST IN CHEMICAL PRODUCTS FOR METAL FINISHING

When you deal with Federated sales and service engineers you'll find their talk of extra service is more than just lip service. As an example, Federated provides free bath analysis for plating shops that wish to use Zimax, the efficient addition agent for zinc plating; and free adjuster solutions are provided with Cadmax, Federated's effective brightener for cyanide cadmium plating, so that no break-in period is required.

Federated provides a well rounded line of quality plating materials and electrochemicals:

ANODES:

All types of copper; zinc; tin; tin-lead; cadmium; brass; silver and lead anodes, including the famous Conducta-Core that lasts three times as long, gives greater throwing power.

NICKEL SALTS:

Domestic nickel salts produced under quality control methods that assure identical plating characteristics from every lot.

ADDITION AGENTS:

Zimax and Cadmax provide maximum throwing power, maximum coverage, maximum allowable current density, maximum brilliance and maximum lustre.

Talk to your Federated dealer or sales engineer to convince yourself that Federated's knowledge and nation-wide facilities can help increase shop efficiency and add to your profits.

Federated Metals

DIVISION OF AMERICAN SMELTING AND REFINING COMPANY
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In Canada: Federated Metals Canada, Ltd., Toronto and Montreal

Aluminum, Anodes, Babbitts, Brass, Bronze, Die Casting Metals, Lead, Lead Products, Magnesium, Solders, Type Metals, Zinc Dust

PERSONALS

Edward W. Marlier, formerly sales representative of Chas. Pfizer and Co., Inc., in the Pittsburgh and Cleveland areas, has been assigned to the headquarters staff of the Industrial Chemicals Department in Brooklyn. Marlier joined Pfizer in 1951 as a production supervisor in the Brooklyn plant, after serving with American Cyanamid Company as a project engineer. He received a BS in Chemical Engineering from the University of Pittsburgh.

Carl W. Lorentzen, who joined Pfizer in 1953 as a chemical sales representative, has been assigned to serve customers in the Pittsburgh and Cleveland areas. Prior to 1953, Lorentzen was with the Valspar Corporation as a chemist and assistant to the production manager. Lorentzen is a graduate of Adelphi College, where he completed pre-medical studies with a BA degree.

Walter Gropler has been assigned to serve customers in the Metropolitan New York area, and **Simon Sluis** will serve as a representative in the Pacific Northwest area.

With **Norman R. Schultz** on their sales-engineer staff, the John B. Moore Corporation is following its policy of having qualified engineers as representatives in order to give scientific help to safety and maintenance engineers in whatever field there is a cleaning problem.

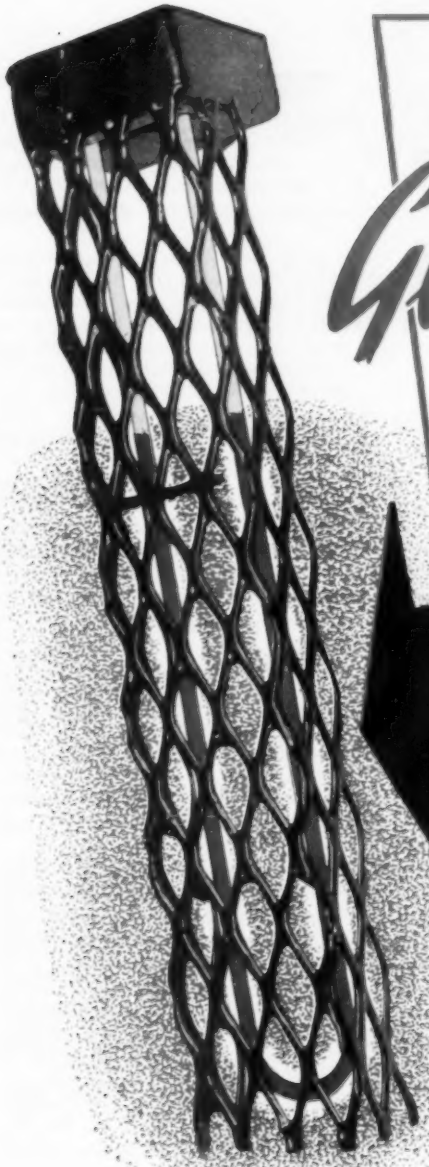
Norman Schultz will handle the sales of John B. Moore Corporation's complete line of cleaning solvents "engineered for safety" in the States of Washington and Oregon.

Norm was graduated from Oregon State College with a BS degree in Electrical Engineering and was elected to Sigma Tau, Eta Kappa Nu, Tau Beta Pi, Honorary Engineering Societies.

Before joining the John B. Moore Corporation's sales force, he served in the Research and Development Program as electrical engineer at Boeing Aircraft in Seattle and has been a Sales Engineer with Shaffer & Nelson, Leach Corporation and Electronic Specialty Company where he was assistant sales manager.

Walter J. Fitzgerald has been appointed manufacturer's representative covering Chemical Products Corp.'s Nelco line of lacquers in New York, New Jersey and Pennsylvania.

Fitzgerald, formerly of Logo, Inc., Division of Bee Chemical Company, has had many years of experience in the sale of lacquers and is exceptionally well qualified to handle the company's line of Nelco lacquers for industrial, novelty, and staple items made from polystyrene, cellulose acetate, vinyl, acrylic, acetate butyrate, and rubber.



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Gives Amazing Performance

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TRANSLUCENT FUSED QUARTZ IMMERSION HEATER

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World's First Successful "U" Tube Heater

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- GUARANTEED TO OUT-PERFORM AND OUT-LAST ALL OTHER QUARTZ HEATERS

Available from your Electroplating Distributor

Big Savings For You With Type "U" Immersion Heaters

You get much longer service life with greatly improved accuracy and heating efficiency from the new Type "U" Glo-Quartz Heaters. Order today—and save time, trouble, money!

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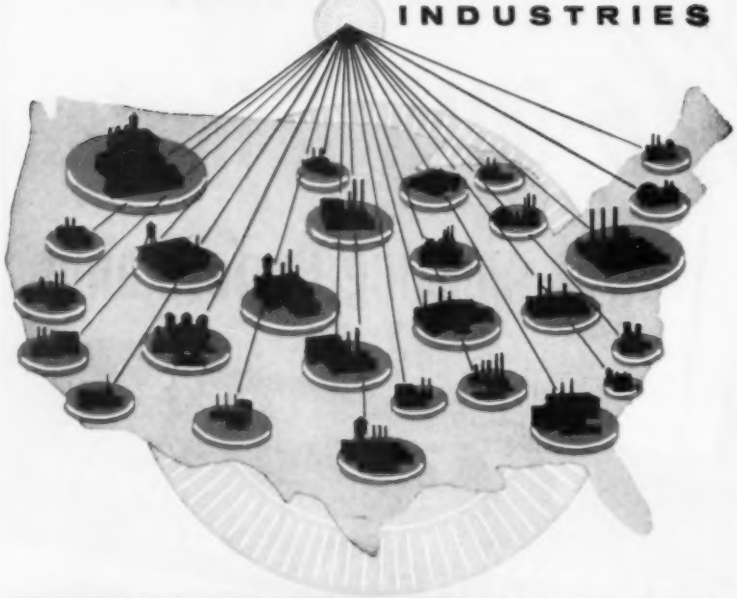
INDUSTRIES



MEAKER ENGINEERED PLATING EQUIPMENT

Meaker equipment is used for efficient and economical plating by many of the nation's most important builders of such products as automobiles, appliances, machinery, furniture and many others. When they install Meaker engineered equipment they are assured that it is designed to meet specific requirements. They are also certain that Meaker will stand behind the equipment during its whole operational life, making sure that it produces the best possible plating job at reasonable unit costs.

Meaker has accomplished much for other manufacturers. Why not find out what we can accomplish for you? Our engineers will be happy to survey your problems with you and recommend the equipment you need. Call or write today!

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● Full Automatic and Semi-Automatic Plating Machines ● Strip Steel Plating Equipment ● Wire Galvanizing Equipment ● Batch Type Plating Machines ● Pickling Machines ● Motor Generators for Plating ● Processing Conveyors ● Rectifiers for Plating

PERSONALS

Paul N. Gillon, formerly in charge of the Office of Ordnance Research at Duke University, has been appointed manager of the Basic Research Branch of The Carborundum Company's Research Laboratory.

In his new position with Carborundum, Gillon will direct a basic research group whose purpose is to acquire new scientific knowledge, keep abreast of the sciences related to Carborundum's endeavors, and transmit new knowledge to persons in other branches of the Research Development Division of Carborundum. Gillon has also been designated project coordinator, responsible to insure that research development projects cover the range of the Company's product interests, prevent duplication of effort, and effect exchange of information between the Central Laboratory at Niagara Falls and product engineering branches of the Operating Divisions.

H. E. Ihrig, sales personnel development specialist for General Electric's Metallurgical Products Department, has been appointed manager of marketing personnel development for the Detroit General Electric component. His new duties are broadened to include the Department's customer education activity as well as personnel development.

Ihrig attended Michigan State University, and was a U. S. Navy pilot during World War II. He joined General Electric 9 years ago, upon leaving the sales organization of American Airlines.

While with General Electric he served in several capacities including marketing research, assistant to the sales manager and specialist in distributor sales.

Robert G. Brierley, formerly manager of training at General Electric's Metallurgical Products Department, Detroit, has been appointed administrator of salaries and organization planning and his new responsibilities will also include manpower development planning.

Dr. Milton L. Weiner of Detroit, Mich. has been appointed to the Chemical Insulation Unit of General Electric Company's Materials and Processes Laboratory, Large Steam Turbine-Generator Department.

R. H. Breeback has been appointed manager of technical services, sales department, machinery division, Crown Cork & Seal Company, Inc.

In his new position, Breeback will be responsible for the development and coordination of technical information and service, including catalogs. This activity involves liaison with the company's domestic and foreign sales agencies, installation, and field service facilities.

UNICHROME
Trade Mark

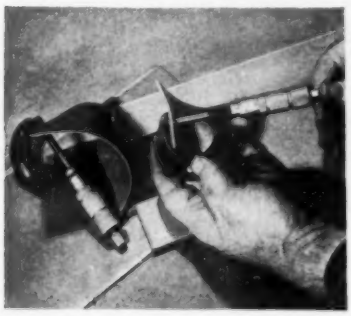
News about
COATINGS for METALS
Metallic . . . . . Organic . . . . . Decorative . . . . . Protective

NEW CHROMATE DIPS CUT COSTS

Protective coating 60 mils thick or more with one spraying

Another improvement in plastisol coatings has again been achieved. Unichrome "Super 5300" Coating delivers the full solids content of vinyl plastisol through a spray gun and builds up a coat 60 mils thick or more in one application. Less of course, if desired.

The coating is physically tough and flexible. It doesn't chip or tear. It has



the chemical resistance as well as the thickness to withstand contact indefinitely with plating solutions, cleaners, water and other corrosives.

Send for Bulletin SVP-1 which gives more data.

**Unichrome is a trademark of Metal & Thermit Corp.*

METAL & THERMIT
CORPORATION
General Offices: Rahway, New Jersey
Pittsburgh • Atlanta • Detroit
East Chicago • Los Angeles
Metal & Thermit—United Chromium of Canada, Limited, Toronto

Unichrome Dips developed that provide chromate solutions with lower make up and operating costs

An unusually wide line of Unichrome Dips for zinc plate, die castings, and cadmium has been made even more inclusive by three new additions to the line. Two of the new compounds are the dry, or powder, form for extra economy in shipping and handling. The third is a wet compound which facilitates solution mixing. All, however, work at extreme dilutions.

NEW ECONOMY

At low make-up concentrations, cost of these three Unichrome Dips descends to a new low. Unichrome Dips are also known for the long service they give before being discarded. End result is the low cost per sq. ft. of finish reported by so many users of Unichrome Dips.

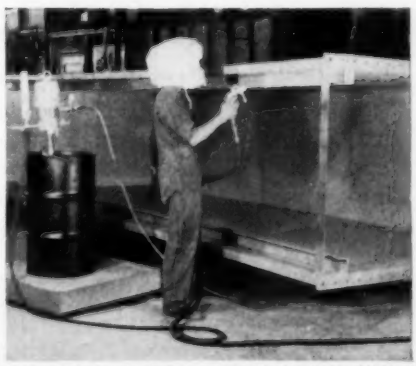
MATCHED TO THE NEED

Unichrome Dip Solutions, forming corrosion-resistant finishes integral with the zinc, improve and protect its eye appeal. Since chromate dips are active solutions which *strip* the zinc as well as convert its surface into an attractive but inactive film, the type of equipment used and the operating time or cycle affect results. The differing needs of manual or automatic finishing must be satisfied to produce the color, the corrosion resistance, the uniformity of finish — as well as the economy desired. No single chromate solution is equally suitable for all applications. This explains why so many specialized Unichrome Dip Compounds are available.

Metal & Thermit will gladly recommend the proper dip to meet specific needs. Simply submit details of the product and the requirements.

Plastisols ideal for protecting tanks

Because of its thickness, chemical inertness and sprayability, the new Unichrome "Super 5300" Plastisol Coating makes a superior tank lining. It can withstand continuous contact with severely corrosive solutions, save over the cost of applying sheet-type linings, and has no seams for corrosive solutions to penetrate. Moreover, there now exist a number of strategically located companies skilled in applying Unichrome Plastisols, and which have the baking facilities to handle even large tanks. Send for names.

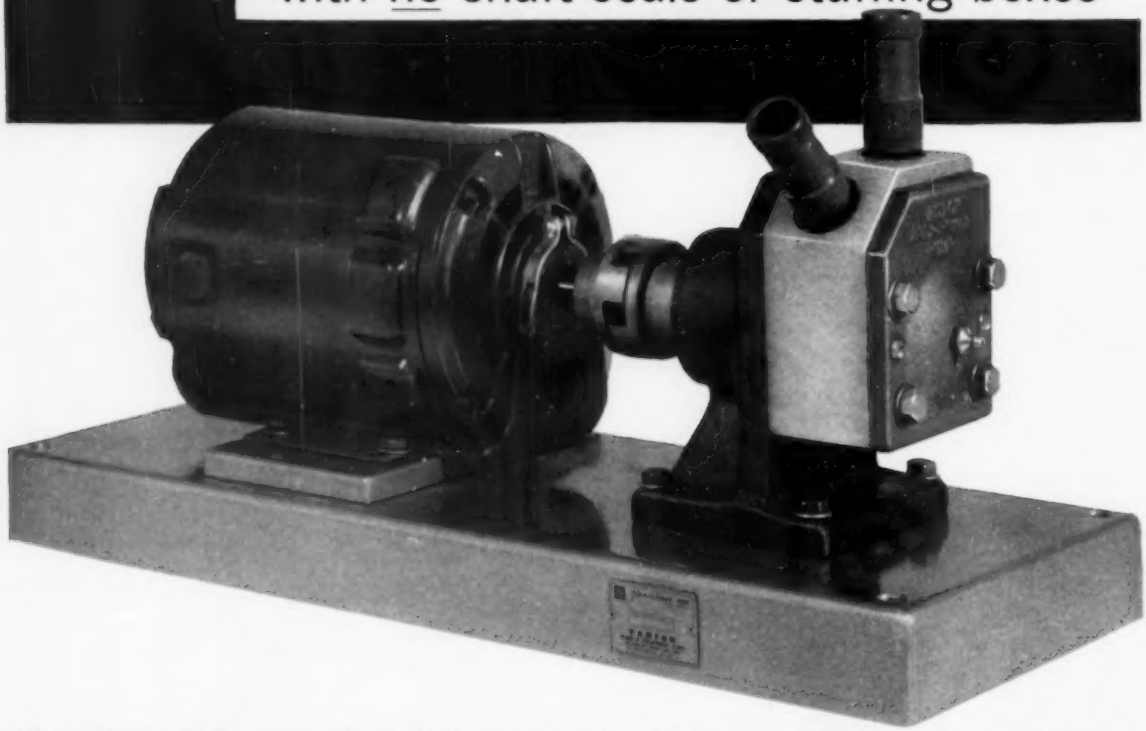


Large plating tanks being sprayed with Unichrome Plastisol prior to being wheeled into baking oven for curing.

the VANTON Plastic "Flex-i-liner" pump

the only (repeat-ONLY) plastic rotary pump

with no shaft seals or stuffing boxes



Costly leakage and metal contamination are no longer problems

. . . for here is a pump truly designed for the plating industry. The unique "flex-i-liner" design eliminates stuffing boxes, shaft seals, gaskets or check valves. Fluid contact is limited to the inner surface of a plastic housing and outer surface of a durable plastic or synthetic flexible liner.

"Flex-i-liner" pumps are ideal for handling such plating solutions as: Brass, Cadmium, Copper, Gold, Nickel, Rhodium, Silver and Zinc, as well as Chromic, Hydrochloric, Sulfuric and other acids found in plating rooms.

Self priming with a gentle, non-shearing pumping action, Vanton "flex-i-liner" pumps are available in capacity ratings from ⅓ to 20 gpm and can be furnished direct connected to constant or variable speed motor equipment. Vacuums up to 26" Hg. are developed.

HOUSINGS: Available in Polyethylene, Buna N, PVC, Bakelite.

LINERS: Available in Neoprene, Buna N, Gum or Natural Rubber, Hypalon, Vinyl or Compar.

Bulletin VP563 on request.

vpe

VANTON
PUMP & EQUIPMENT CORP.
division of Cooper Alloy Corporation **HILLSIDE, N.J.**

ACME *Automatics*

OFFER THE SOLUTION to MANY PROBLEMS of PRODUCTION FINISHING

Production finishing demands not only high output at low unit cost, but also a uniform finish meeting required standards. Acme Automatics can be depended upon to deliver high production at minimum cost and maintain your finish requirements. Acme performance has been proved in production for nearly half a century.

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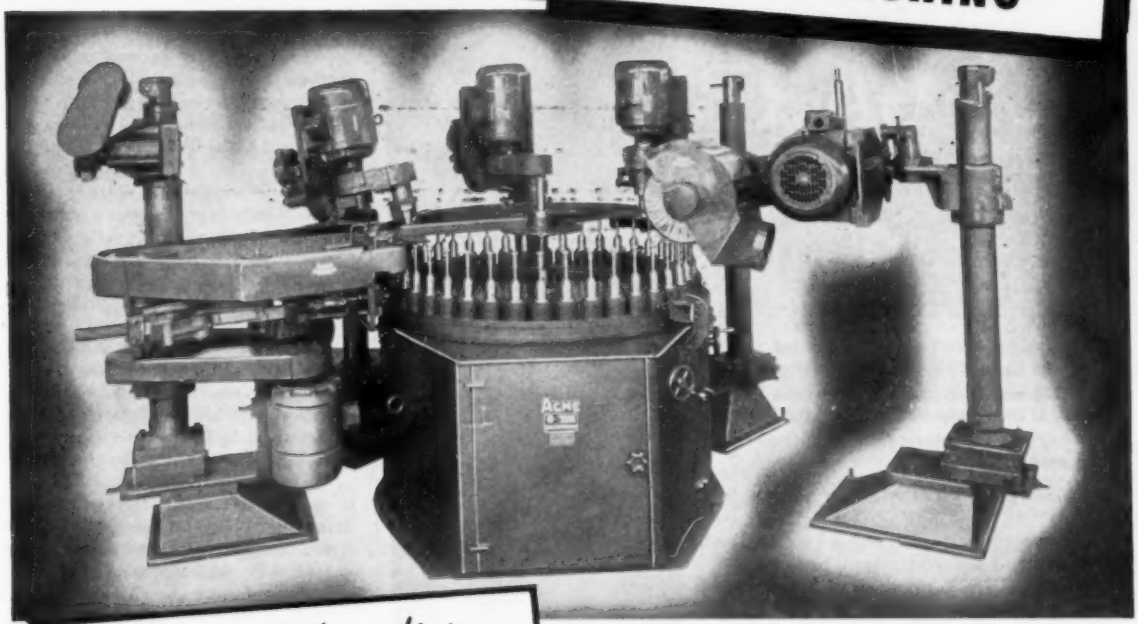
MICRO-FINISHING



ROTARY *Automatics*
STRAIGHT LINE *Automatics*
SEMI-*Automatics*
Catalogs on Request

Recommendations & Quotations

For recommendations, send blue prints of part or samples before and after finishing operations, together with detailed information on finishing operations and production requirements. If production methods will cut your costs, we can set your job up in our experimental processing department and you can inspect the machines in operation.

SPECIAL MACHINERY — AMC — AUTOMATIC BUFFING MACHINES

ACME *Manufacturing Co.*

1400 E. 9 MILE RD., DETROIT 20 (Ferndale) MICH.

Builders OF AUTOMATIC POLISHING AND BUFFING MACHINES FOR OVER 35 YEARS

FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE A 1005.

L—1000. Automatic Plater—The Udylite Corp. has published a four-page bulletin on their full automatic plating machines. It appears to be the clearest explanation the company has ever printed of the distinguishing features of their machines. The bulletin provides an excellent check list for anyone considering the purchase of automatic equipment.

L—1001. Meaning of Reagents—New Film—For the first time, reagents—those high-purity materials vital to modern research, quality control, technology and clinical science—are the "stars" of a motion picture. Called "Precision Tools in Bottles," the 10-minute 16-mm sound-color film was produced by Fisher Scientific and directed by Robert Baron (who did many of the memorable scenes in "Cinerama Holiday"). It develops the theme that in design, manufacture, specifications and testing, today's reagent-grade chemicals are precision tools.

The movie may be borrowed, without charge, from Fisher Scientific—it will be sent postpaid. It is recommended for showings to laboratory, classroom and professional groups.

L—1002. Film Tells Tinplate Story—Bethlehem Steel Company has announced the release of its newest 16mm-sound motion picture, "Bright Steel," which describes the manufacture of quality tinplate and backplate.

Filmed in Eastman Color at Bethlehem's Sparrows Point, Maryland, plant, the 29-minute picture details the production of versatile tinplate and its use in food canning, bottle capping and other industries. The film was cited with an award at the recent Cleveland Film Festival "for its graphic picture of industrial processes."

L—1003. Pipe Fabrication Manual—A new eight-page brochure, featuring fabrication techniques and technical information on applications of Bart Lectro-Clad nickel lined pipe and fittings, has been published by the Bart Manufacturing Corp., Belleville, N. J.

Photomicrographs illustrate the pore-free and unique adherent characteristics of the pure nickel lining applied through the exclusive process, which, it is reported, affords the protection of pure nickel against contamination of product and corrosion, plus the economy and structural strength of seamless steel.

A separate section, complete with engineering drawings, is devoted to welding procedures and general fabrication techniques, demonstrating the ease with which these pipe and fittings can be fabricated or repaired in the field.

L—1004. Strippable Coating—An illustrated bulletin on strippable protective coatings is now available from the Bischoff Chemical Corp., Ivoryton, Conn. on the recently developed, special non-oil exuding compound now incorporated in their line of strippable protective coatings.

Thermo-Cote N-4, as it is called, is designed for specific applications such as masking surfaces in plating, or etching operations and has a unique water-white clarity which facilitates the cutting of the mask.

L—1005. For Lacquer Spray Booths—Klem Chemicals, Inc., has introduced a new non-caustic, non-oily, non-foaming compound for conditioning the water, protecting equipment and reclaiming paint in all types of water-type spray booths. It is especially formulated for use with lacquers.

L—1006. Organic Complexes of Mo—A four-page bulletin, "Organic Complexes of Molybdenum," summarizing all available information on the formation, formula, chemical properties, and uses of organic complexes and organometallic compounds of molybdenum has been published by Climax Molybdenum Co.

Organic molybdenum complexes are essential features of patents for the manufacture of incandescent bodies, preparation of phthalocyanine dyes containing molybdenum, metallizing of polyazo dyes for wool and leather, and the preparation of hard phosphate coatings on metals.

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DUPONT ORLON or UNION CARBIDE DYNEL
WORK CLOTHING
OFFERS . .

Proven protection against most acids and chemicals.
Long wearing (outwears cotton 10 to 1) at minimum cost—New Low Prices.
Your best prescription for maximum safety.
Guaranteed satisfaction or no cost to you.
Appearance excellent - - - expertly tailored for your requirements.
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Best buy — BUY PLY GARB.

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MILBURN COMPANY DETROIT 7, MICHIGAN
— MANUFACTURERS OF —
Ply Skin Protection — Plastic Coated Gloves for 25 Years

Facts to consider when you're buying

Chromate Conversion Coatings

for Corrosion Protection, Paint Base, Decorative Finishing

WHAT IS IRIDITE®?

Briefly, Iridite is the tradename for a specialized line of chromate conversion finishes. They are generally applied by dip, some by brush or spray, at or near room temperature, with automatic equipment or manual finishing facilities. During application, a chemical reaction occurs that produces a thin (.00002″ max.) gel-like, complex chromate film of a nonporous nature on the surface of the metal. This film is an integral part of the metal itself, thus cannot flake, chip or peel. No special equipment, exhaust systems or specially trained personnel are required.

If your company is manufacturing or buying parts or complete assemblies made from or plated with any of the more common non-ferrous metals—zinc, cadmium, aluminum, magnesium, silver, copper, brass or bronze—you've probably already run up against the question of finishing these surfaces with a chromate conversion coating. These coatings are used to protect against corrosion, or to provide a base for paint or to provide a decorative finish for sales appeal or shelf life. Since chromate conversion coatings represent a relatively new means of obtaining these finishes, this digest of facts to consider may be of value to you.

1. THE COATINGS THEMSELVES. There are many brands on the market. All are similar in many ways. Each, of course, offers its own specific advantages and these may relate to operating techniques, performance under actual use conditions, cost, availability, etc. Naturally, you'll want to choose a coating that is widely known and accepted under both military and civilian specifications.

2. THE COMPANY BEHIND THE PRODUCT. Is it a reliable, established organization? Does it offer experienced technical service, both from the field-engineering organization as well as the home office and laboratories? The man who sells and services your installation should be thoroughly familiar with not only chromate conversion coatings and their applications, but also with the characteristics and performance of related finishing operations such as precleaning, electroplating, painting, etc. This is most important since all steps of the finishing cycle must be functioning properly for the satisfactory performance of the ultimate finish produced.

3. AVAILABILITY OF THE PRODUCT. Ideally, of course, the material should be readily available to you from nearby warehouses to avoid time loss in long distance shipping and to provide emergency service, should the need arise.

4. COST. Naturally, the initial price of the material is important to you. However, just as you consider ultimate cost when you are buying mechanical equipment, ultimate cost must be considered for these finishing chemicals. So, it will pay you to investigate consumption costs, labor costs and the other factors which go into the determination of ultimate cost. Further, cost alone gives no indication of product performance, so careful attention must be given to the purpose the finish must serve and the value that finish will add to your product.

5. FACILITIES FOR RESEARCH AND DEVELOPMENT. Perhaps the existing types of chromate conversion coatings do not include a compound that will accomplish exactly what you wish. Then, it is important to deal with a supplier who has adequate research and development facilities available to work with you to produce a material to meet your needs. Naturally, such a project is seldom completed overnight. But, with complete cooperation and confidence from both you and your supplier, chances are a satisfactory program can be completed.

These are the concepts of sales and service on which we, Allied Research Products, Incorporated, have developed and marketed the line of Iridite chromate conversion coatings . . . superior product performance, complete sales and technical service, easy product availability, economical cost, extensive research and development facilities. No doubt you are familiar with our line and have seen this trademark—

IRIDITE®

—in our advertising, technical literature or on shipping containers in your plant. Remember this trademark when you're buying or investigating chromate conversion coatings for your company. It's your assurance of quality, economical products from a reliable and established company, skilled sales and technical service from both our home office and a national network of representatives, immediate availability from warehouses in strategic industrial areas and our willingness to work with you to develop new finishes to meet your needs, should the present line fall short.

For complete information on Iridite chromate conversion coatings, write today for your free copy of our technical data file. Or, for immediate advice, call in your Allied Field Engineer. He's listed under "Plating Supplies" in your classified telephone book.

ALLIED RESEARCH PRODUCTS
INCORPORATED
4004-06 E. MONUMENT STREET • BALTIMORE 5, MD.

Manufacturers of Iridite chromate conversion coatings for corrosion resistance, paint systems, final finishing of non-ferrous metals; ARP Plating Brightener & Chemicals. West Coast Licensee—L. H. Butcher Co.

L—1007. Filter Pump Units—Newly designed filter pumps for highly corrosive solutions are described in an eight-page bulletin.

Various plastics—lucite, rigid PVC, polyethylene, etc. and corrosion resistant metals are used. Pumps are self priming, leakproof, centrifugal type, all plastic, and incorporate backwashing features. Particles down to 1 micron can be removed from solutions. Specific filtration equipment is described for solving special problems. Photographs show pumps in action. Complete price sheets are enclosed.

L—1008. Selenium Rectifiers—Bulletin GEA-6545, 12 pages, gives features, application, charts, construction, dimensions, specifications and other data on ¾ kw to 125 kw selenium rectifiers as well as multiples to 500 kw.

L—1009. On Phosphating—A detailed phosphating folder, covering the entire Turcoat line of phosphating and metal protective coating materials has been issued by Turco Products, Inc., manufacturer of specialized chemical processing compounds.

A portion of this folder is devoted to a general discussion of phosphating. Also featured is a valuable phosphating reference chart, which describes the purpose and make-up of each type of coating, recommended uses, applicable government specifications, methods of application, equipment requirements, metals that can be coated, coating weights and basic operational cycles.

L—1010. Aluminum Cleaners—Northwest Chemical Company has issued a four-page brochure giving a description of Aluminum cleaners. It outlines also systems being used successfully in preparing aluminum for welding.

L—1011. Carbide Tools—A new industry-service brochure on carbide rotary cutting tools has been issued by the Abrasives Division of Elgin National Watch Co.

The booklet presents Elgin's complete line of solid carbide end mills, rotary files and miniature cutters, and explains the use of such tools for scale and flash removal, blend and twist welds, machining in tight spots, as well as for deburring, counter-sinking, and chamfering.

L—1012. Motors—Bulletins GEC-1026A and GEC-1027A, each 11 pages, give buying information on a selected group of General Electric motors. Included are application data, ratings and prices for fractional horsepower motors, integral-horsepower polyphase and single phase induction motors, motors and control for part-winding starting, gear-motors and resilient-base integral-horsepower induction motors.

L—1013. Engineering Drawings—A recent addition to Pennsalt's corrosioneering service is a new series of engineering drawings incorporating the latest technology in construction methods for acid resistant brick installations.

Graphically diagrammed are details of acid proof masonry construction for six typical installations: a pump base, column pad, tank outlets, bell and spigot joints, floors and trenches.

L—1014. Cooling Controls—A new bulletin describes the Sarco self-powered cooling controls for compressors, stills, solvent coolers, degreasers, oil coolers, small engines, condensers. It includes operational drawing and hook-up sketches.

L—1015. Barrel Finishing Catalog—The Almco Division of Queen Stove Works, Inc. Albert Lea, Minn., has published a 52-page general catalog of Supersheen barrel finishing equipment.

New design considerations make possible ultra-low microinch surfaces and close tolerance radii to a degree never before possible. Advancements have also broadened the range of parts that can be economically barrel finished. Parts of metal, plastic, rubber and other materials, in almost all shapes and sizes can be descaled, deburred, ground, burnished, etc., as the case may be with substantial cost savings over other methods. "Pinhead" size parts and huge parts weighing over 400 pounds have been successfully processed.

Practical applications of "submerged" barrel finishing and the "fixture" type of barrel are also achieving new horizons for deburring and finishing.

Just hanging soiled metal parts in a tank of soak cleaner won't necessarily get them clean. You've got to be sure that the cleaner *gets into the soil.*

You *can* be sure with . . .

Cowles **NS SOAK CLEANER**

Cowles NS Soak Cleaner penetrates deep into crevices and recesses to wet-out crusty soil deposits. Emulsifies oil and grease. Disperses drawing, stamping and buffing compounds.

No scum on the cleaning tank to foul cleaned metal coming out. Clean it with Cowles NS Soak Cleaner and it stays clean.

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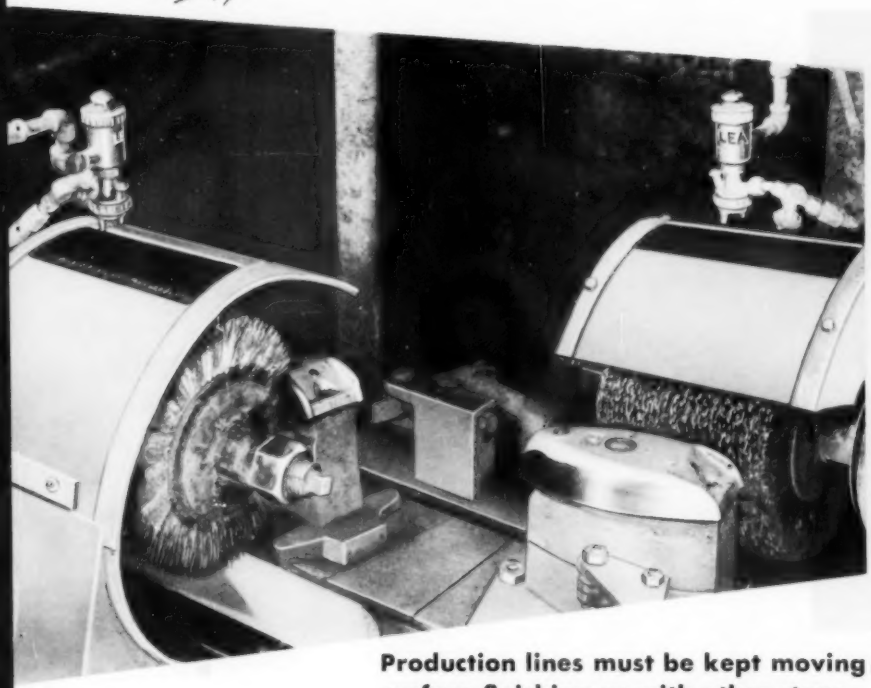
Cowles CHEMICAL COMPANY
Cleveland 3, Ohio

See Cowles NS and JQC advertisements on pages 1204 and 1232.

LIQUABRADE



SPRAY BUFFING at its AUTOMATIC BEST!

Production lines must be kept moving... with surface finishing as with other steps.

LEA LIQUABRADE, available in a wide range of abrasive grain types and sizes, is the ideal liquid abrasive composition for automatic buffing. Already widely used and growing in use, LIQUABRADE is enabling companies with big production schedules to keep the buffing line moving right along while producing the desired finish at exceptionally economical levels.

Here are some of the high light economics:

- **no nubbin waste or rehandling.**
- **production much faster, of course, than with bar applications.**
- **the finish is more uniform due to automatic, steady, uniform spray application and uniform cutting action.**
- **buffs last longer.**
- **all operations are automatic and continuous.**

In large measures these same advantages apply to hand-fed articles with a single wheel. One doesn't have to have production lines to derive values from Lea Liquabrade spray buffing operations.

We'll be glad to send you full details with detailed range of grit grades. Also suggest how you can set up your operations for spray buffing if you will give us the details of your present operation and a description of your product and the finish desired. Better yet, send samples.

Burring, Buffing, Polishing, Lapping, Plating and Spray Finishing... Manufacturers and Specialists in the Development of Production Methods, Equipment and Compositions. Manufacturers of Lea Compound and Learak ... Industry's quality buffing and polishing compounds for over 30 years.

The Hallmark of Quality Products

THE LEA MANUFACTURING CO.
16 CHERRY AVE., WATERBURY 20, CONN.

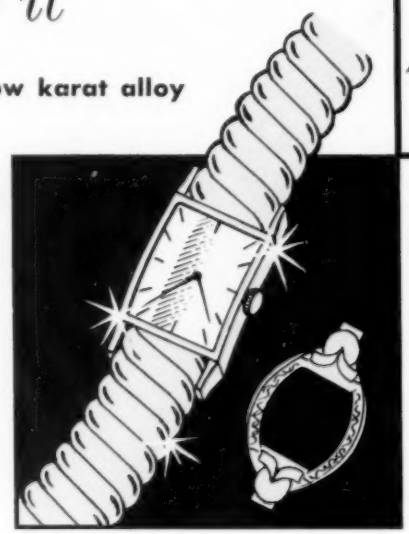
Lea-Michigan, Inc., 14066 Stansbury Ave., Detroit 27, Mich.
Lea Mfg. Company of Canada, Ltd., 1236 Birchmount Road Scarborough, Ontario, Canada
Lea Mfg. Company of England, Ltd., Buxton, England
Lea-Ronal, Inc., Main Office and Laboratory: 139-20 109th Ave., Jamaica 35, N. Y.
Manufacturing Plant: 237 East Aurora St., Waterbury 20, Conn.

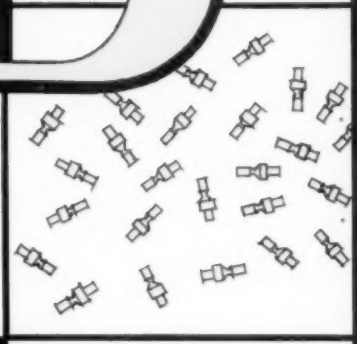
Are you interested in Plating Specialties? **SEE THE OTHER SIDE OF THIS INSERT.** ➡

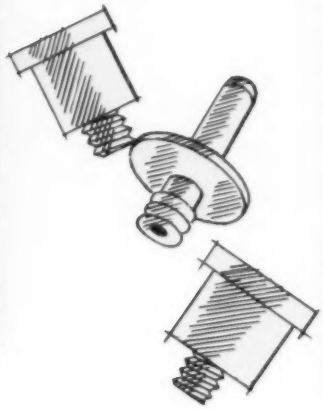
GOLD

as you like it

24 karat **low karat alloy**







Since the operations of its first commercially proved decorative gold process in 1949, Lea-Ronal has continually been striving to give the plater gold processes that meet his requirements. As the result of constant research and experience, we can offer platers proved processes with the following outstanding values:

- **Bright 24 karat or bright low karat alloy (16-20K) directly from the bath.**
- **Economy of operation . . . the Lea-Ronal bath contains only half the amount of gold found in the least concentrated conventional bright baths . . . hence, gold investment is reduced . . . drag-out loss is correspondingly low.**
- **Simple operations and control — both processes operate at room temperature without special current manipulation cycles.**
- **Outstanding wear resistance; a well-known manufacturer conducting a series of controlled wear-tests reports that the resistance of a 0.000050 inch deposit of Lea-Ronal MS was equal to that of a 0.0002 inch deposit from a conventional deposit.**
- **Alloy deposits that are bright with excellent hardness and that can be made to approach rolled gold plate in color.**

If your requirements call for 24 karat gold deposits, investigate the Lea-Ronal Bright Gold MS; if alloyed colored deposits, it would be Lea-Ronal Bright Gold MSA.

Why not get full details of either or both? Most existing solutions can be converted. We would appreciate it if when writing, you would outline your operations and detail your problem.

The
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serving the Finishing Field
Lea-Ronal, Inc., Jamaica, N. Y.
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with any one of the above, half price:

ORSANCO's "Procedures for Analyzing Metal-Finishing Wastes", Not $1.00 but	.50

(No lab or shop in the industry should be without one!)

(Special prices for multiple orders.)

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"ENCYCLOPEDIA OF CHEMICAL REACTIONS" Volume VI

Edited by C. A. Jacobson and Clifford A. Hampel and 15 associates

$15.00 nonmembers, $13.75 members

This additional volume is now ready. It runs some 800 pages covering the elements Samarium, Scandium, Selenium, Silicon, Silver, Sodium, Strontium and Sulfur.

This entire group is a monumental series which attempts to list all the known inorganic chemical reactions published in existing literature in all languages.

All material is alphabetically arranged, first as to formulas of the reactants and next as to reagents. Explanatory paragraphs describe the conditions governing each reaction (color, odor, crystal form, yield, etc.), equations showing the progress and other pertinent data. Easy to use indexes quickly help locate both the reagents and the compounds formed.

The five volumes preceding this one:

VOLUME
Aluminum, Antimony, Arsenic, Barium, Beryllium, Bismuth, Boron, Bromine.
1946, 804 pages, 3000 reactions, $15.00, AES Members $13.75.

VOLUME II
Cadmium, Calcium, Carbon, Cerium, Cesium, Chlorine and Chromium.
1948, 927 pages, 3325 reactions, $17.50, AES Members $14.85.

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Cobalt, Columbium, Copper, Didymium, Dysprosium, Erbium, Europium, Fluorine, Gadolinium, Gallium, Germanium, Gold, Hafnium, Holmium, Hydrogen, Illinium, Indium, Iodine, Iridium.
1949, 800 pages, 2757 reactions, $17.50, AES Members $14.85.

VOLUME IV
Iron, Lanthanum, Lead, Lithium, Magnesium, Manganese, Mercury, Molybdenum, Neodymium.
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VOLUME V
Nickel, Niobium, Nitrogen, Osmium, Oxygen, Palladium, Phosphorus, Platinum, Potassium, Praseodymium, Radium, Rhenium, Rhodium, Rubidium, Ruthenium.
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REPORTS FROM ALL OVER . . .
STRIPPED, CLEANED, DEGREASED

No new sustained boom in total business activities is to be expected this year. Inflationary forces predominate now. However, this is not a period of true inflation. A true, classic inflation is one in which there are many shortages, and in which wages and prices spiral upward feeding on a rapidly expanding money supply . . . A most unusual feature is that there exists an election year-federal budget surplus. No tax cut can be expected.

A new German device for measuring the depth of surface cracks has been announced. It is a direct reading instrument made by **Karl Meyer Apparatebau,** Hamburg. It is reported to give results to something better than 0.1 mm. The feeler is put on a workpiece to send a direct current through it by way of a pair of contacts. Changes in potential drop are said to be a reliable measure of the crack depth.

Adding sodium orthoaminobenzoate and sodium phenylxanthate to the plating bath is said to yield brass coatings (on costume jewelry, door knobs, etc.) which stay bright up to 0.001 inch. Plating time is said to be cut 10 per cent.

To protect small metal parts from corrosion moisture, **ES&A Robinson Ltd,** of England, introduced a printed protective paper envelope coated on the inside with a moistureproof lacquer (which also keeps grease from soaking through).

In its new three-compartment unit, **Roto-Finish** of London uses fine plastic particles (Pertrinol). These are added after grease is removed by the solvent "to scrub" the component surfaces, penetrating even into threads. The particles swell and soften slightly in the hot solvent.

Two new British instruments by **Electroselenium Ltd.** are photo-electric devices for particle size measurement. The Eel powder reflectometer is said to determine specific surfaces of powders of less than 1 micron size quickly and accurately by "tinting strength" method, and can be used by comparatively unskilled workers under any conditions. The Eel photo-extinction sedimentometer allows particles in the subsieve range to be accurately sized.

Vibrasorb, a new-type rubber V-belt featuring built-in spring action is said by **BF Goodrich,** Akron, to absorb 24 per cent more vibration than belts currently rated as low-vibration belts. By isolating and absorbing vibration, these belts are claimed to minimize vibration transmission between pulleys.

An X-ray fluorescence instrument which permits continuous determination of metal coating thickness to the millionth of an inch has been developed by **Applied Research Labs.** of California. The instrument is designed to fulfill the need for continuous analytical control in industries where a single element determination is of importance.

METAL PRICES

ALUMINUM (99% pure plus ingot)	27.10¢
CADMIUM (Platers' shares)	$1.70
CHROMIUM (Electrolytic 99.8%, metallic basis, 0.2 Fe)	$1.25
(Less than ton lots)	$1.27
COPPER (Electrolytic, domestic)	40.00¢
GOLD (per oz US price)	$35.00
LEAD (Common, N. Y.)	16.00¢
MAGNESIUM (Ingot FOB Newark)	37.45¢
(Stick - 100 lbs or more)	59.60¢
MERCURY (Spot or nearby N. Y.)	$255.00-$257.00
NICKEL (US duty included) electrolytic cathodes	64.50¢
PLATINUM (With some sales as high as $110.00)	$103.00-$105.00
RHODIUM	$120.00-$125.00
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TIN (Spot delivery)	106 62½¢
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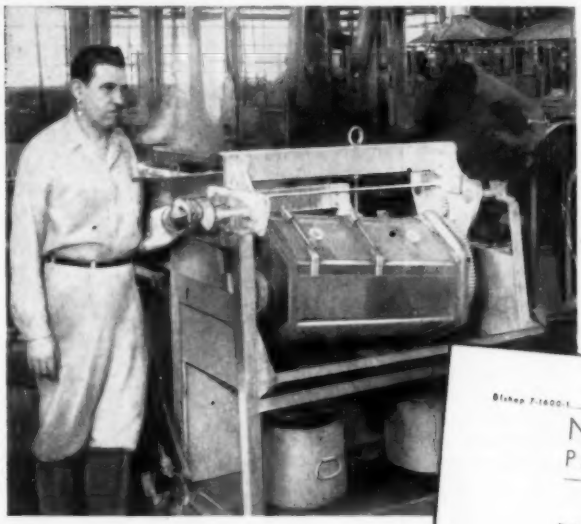
"The New BELKE DOUBLE OSCILLATING CYLINDER



gives us

"more uniform distribution of plate according to quality control checks

"noticeable color improvement on brass plating

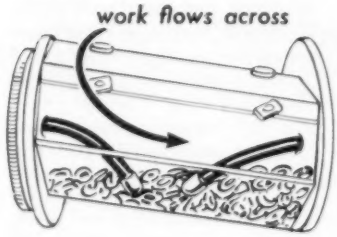
"20% increase in load sizes."

Says Paul Glab,
Superintendent of Plating,
Northwestern Plating Works, Chicago.

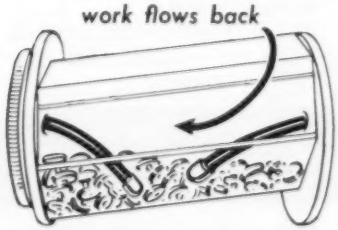
Improved Quality Control and increased production with lower cost are a cinch with this new BELKE Plating Cylinder.

The cylinder oscillates as it rotates

work flows across



work flows back



all sides of all parts are equally exposed to plating current. No part of the load stays at the ends where little plating occurs. No parts stay buried with greatly reduced exposure to plating current

Do you realize that this 20% saving in plating cost is all profit you are not getting now!

Bishop 7-1600-1

NORTHWESTERN
PLATING WORKS

3114-26 SO. KOLIN AVE. • CHICAGO 23, ILL.

March 23, 1956

Belke Manufacturing Co.
947 N. Cicero Avenue
Chicago 51, Illinois

Gentlemen:

In reply to your inquiry, our Belke Double Oscillating Plating Barrel is giving much greater improvement in plating results than we had anticipated.

Quality control checks show plating thickness is much more uniformly distributed. The over plating of some parts and under plating of others, that occurs with conventional plating cylinders, is avoided.

The improvement is particularly helpful in plating washers and other flat parts which so often come through partially plated because the parts stick together.

We have used the double oscillating barrel on brass, zinc, and cadmium plating with equally good results. On brass plating work it gives a noticable improvement in color.

In addition, we have increased the load size 20% while turning out the best plating work we have ever produced.

We consider the new Belke barrel an important asset to our operation and will be glad to show it to other platers who are interested.

Very truly yours,

NORTHWESTERN PLATING WORKS
Paul Glab
Paul Glab, Supt. of Plating

Ask your BELKE Service Engineer or write for literature.

Belke Manufacturing Company
947 N. Cicero Ave., Chicago 51

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The following excellent rebuilt and guaranteed electroplating motor generator sets and rectifiers, with full control equipment:

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1—H-VW-M Full-Automatic Plating Machine, 87' long, 39" lift, was used for chrome.

1—UDYLITE Semi-automatic Plating-Machine, for cyanide, size 19' long x 48" wide x 36" deep.

2—**RONCI** Enamelers, No. R-100 and No. R-200.

1—MODEL "A" PRESSURE BLAST.

Above is partial list only. Write to us for all your requirements for Plating, Anodizing and Metal Finishing

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COVER STORY

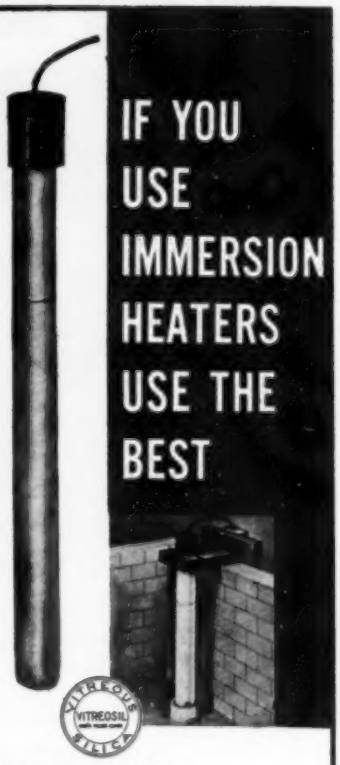
From Greenockite

Cadmium is an ideal metal for plating. It is a soft bluish-white metal which is frequently mistaken for zinc by the uninitiated eye. It is, in fact, closely related chemically to zinc; occurs in small quantities associated with zinc. Approximately 45 hundred tons of cadmium are produced and 4000 tons are consumed annually in the United States. More than half of this quantity is used as electroplate. It is available in cast slabs, 12 inch sticks and 2 inch balls and other special electroplating anodes.

Cadmium is not attacked by dry air; however, in moist air, a superficial adherent grayish-white film forms which protects the metal from further oxidation. It is corrosion resistant in water but is oxidized by steam. It occurs in the rather rare mineral, greenockite (CdS) and also in small amounts in ores of zinc, from which metal it is separated by fractional distillation or by precipitation with zinc dust from a solution prior to electrolytic deposition. Chemically, cadmium is bivalent forming but one oxide, CdO (of characteristic brown color) a hydroxide, $Cd(OH)_2$, the salts $CdCl_2$ and $CdSO_4$, etc. It is soluble in dilute acids, and when heated in air, it burns yielding the oxide. All its soluble compounds are poisonous.

Cadmium is such an ideal metal for plating that a combination of the most unorthodox material and personnel can create lustrous, enduring, attractive corrosion-resistant protective coatings such as the machined parts shown on our cover. Cadmium plate has tremendous adhesion, is easily achieved and adheres even through carbon. It is the only genuine protection for cast iron to which, incredibly, it adheres well.

We are indebted to the author of the article which appears in this issue, "Practical Aspects of Cadmium and Zinc Plating," by J. Kosmos of Kosmos Electrofinishing Research, Inc. for the picture.



U.S. Patent No. 2,654,820

Compact, safe and efficient, *Vitreosil*® electric immersion heaters offer you your most dependable units. Designed for acid pickling and electroplating solutions and other acid baths, *Vitreosil* heaters give greater heat transfer per unit area and greater resistance to chemical attack.

***Vitreosil* immersion heaters are made of pure fused silica and have special corrosion-resistant caps, built-in ground wires for additional protection and easily visible minimum immersion depth markings.**

***Vitreosil* immersion heaters will serve you best. Write for bulletin and prices.**

THERMAL AMERICAN FUSED QUARTZ CO., INC.

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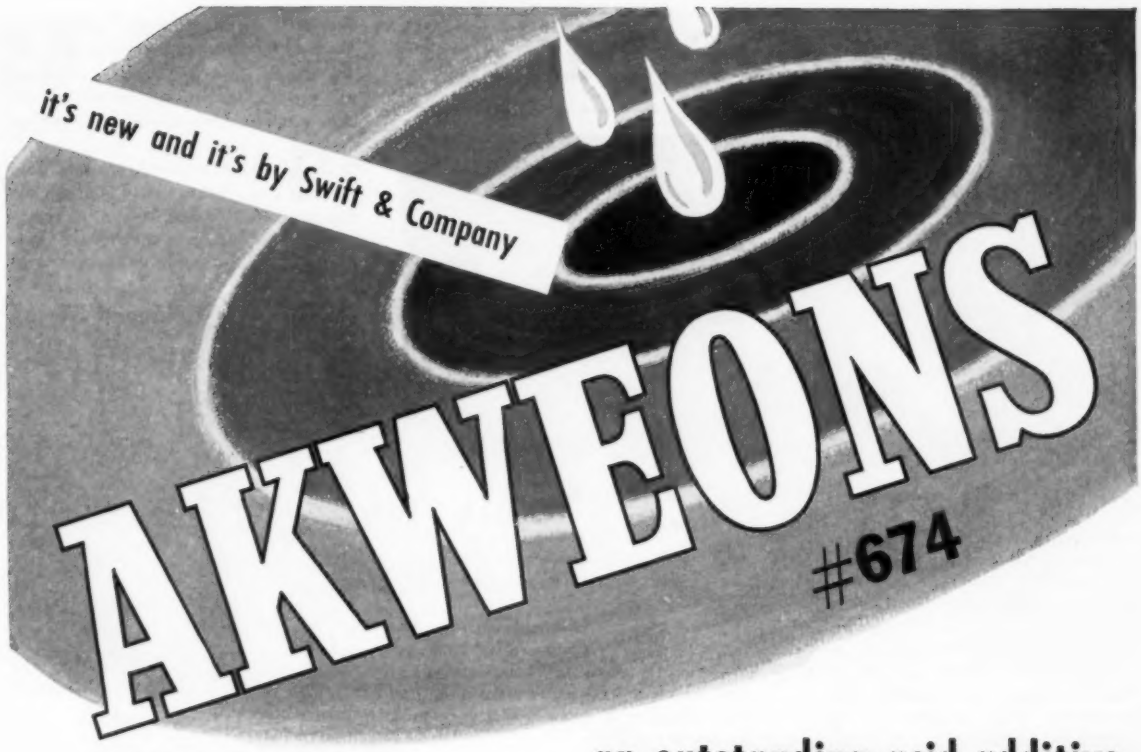
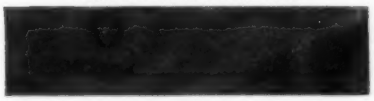


Pickled Without AKWEONS



Pickled With AKWEONS

. . . an outstanding acid additive and fume depressant!

Here's the product electro-platers or anyone doing acid pickling have been looking for . . . AKWEONS #674 by Swift.

AKWEONS #674 is a new wetting agent and emulsifier developed for use in sulphuric, hydrochloric or phosphoric acid baths. While the basic purpose of AKWEONS #674 is to retard attack by the acid on the parent metal without affecting the acid's action on surface impurities, it also exhibits excellent fume depressant and rust preventive properties. The overall results therefore are a great reduction in fuming, substantial acid savings and less weight loss in the metal being bathed.

There is only one way to find out what AKWEONS #674 can do for you and that's by a trial in your own plant. Use the coupon below to get full information on the special introductory trial offer. It's easy and inexpensive and we believe you'll find that . . .

ONE TRIAL IS BETTER THAN A THOUSAND CLAIMS

Here are the important features of AKWEONS #674:

- Rust preventive properties
- Helps retard corrosion
- Fume depressant
- Helps minimize loss of base metal to acid attack
- Can be used in small quantities
- Saves acid (according to users)
- Soluble in acid, alkaline or neutral solutions

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To Serve Your Industry Better

O-27PL

RETURN THE COUPON

For information on a trial order. There is no obligation — except that AKWEONS #674 be used as directed to insure optimum results.

SWIFT & COMPANY, Industrial Oil Dept.
2218 165th St., Hammond, Indiana

Please send further information on a trial order of AKWEONS #674.

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Company .....

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City ..... Zone ... State .....

Principal process is: .....

Equipment and Supplies

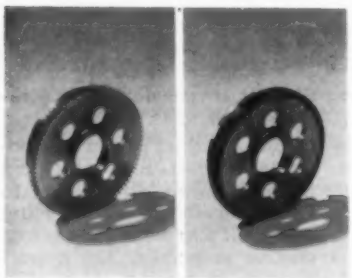
Spray Can Detector

Deodorizer

E—1016. Flaw Detector—An improved method for detecting surface flaws by visual inspection on non-porous materials is now being marketed by Zaco Labs, a division of Zip Abrasive Co., Cleveland. This new two-step inspection process locates cracks, fractures, cold shuts, tiny surface fissures, porosity and imperfect welds on iron, steel, brass, aluminum, porcelain, plastics and ceramics.

E—1017. Sanitizer—Pulmosan Safety Equipment Corp. announces their new sanitizer which cleans, deodorizes and sanitizes.

The sanitizer is especially effective for removing grease, grime and dirt from rubber, metal, glass. It is a neutral cleaner and rinses free in the hardest of waters. It is available in 1¼ ounce or quart size unbreakable containers.



Taped Teeth

E—1018. Time Saved by Taping—A midwestern manufacturer of precision gears for guided missile mechanisms has eliminated a serious pre-plating bottleneck by substituting a plastic electrical tape for a three-ply brushed laquer coating.

The steel gear, 4 inches in diameter, is cadmium plated except for the teeth, the 1-inch center hole and the 1-3/16 inches outer diameter of the hub. These surfaces were being masked laboriously by brushing on three successive coats of lacquer, each requiring 30 minutes to dry. After plating, another 30 to 45 minutes was consumed in scraping off the lacquer. Total time per gear, before and after plating, was as much as 210 to 225 minutes.

Production men discussed the problem with a field engineer of Behr-Manning Co., who suggested a trial of No. 507 Behr-cat tape, a pressure-sensitive electrical tape of polyvinyl chloride which, only 7 mils thick, conforms easily to contours, withstands attack by plating solutions yet is easily peeled off after plating.

After testing, the manufacturer specified this tape in a width about ½-inch greater than that of the gear teeth. Stretched tightly, it is wound three times around the teeth. Then the trailing edge is securely fixed by heating it slightly with a warm iron.

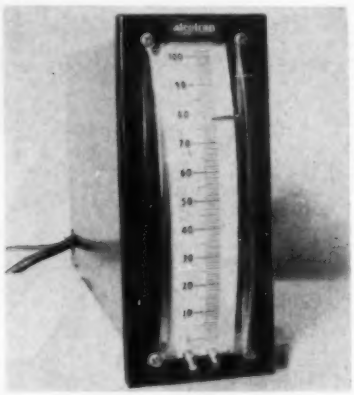
Center hole and hub are still lacquered, but the entire time for applying and removing tape and lacquer has been cut to 40 minutes—a reduction of 3 hours or approximately 80 per cent.

E—1019. Rust Preventive—A new multipurpose rust preventive base which can be mixed with water, solvent or oil, or used neat, has been announced by E. F. Houghton & Co., manufacturers of oils, chemicals and packings.

Identified as Rust Veto M.P., this water displacing rust preventive base has an exceptionally wide range of uses for indoor protection. When mixed with water, it provides a safe, non-flammable emulsion with high stability and excellent protection value. Rust Veto M.P. can be used to replace dangerous solvents or similar flammable slushes and is especially economical when mixed with water.

E—1020. Vertical Scale Indicator—This new miniature type vertical scale indicator is designed to provide a compact, easily read instrument with minimum price and adequate performance as important features.

Manufactured by the Automatic Temperature Control Co., Inc. of Philadelphia, it is a semi-null balance, low cost servotype indicator for use with differential transformers (Atcotran) and resistance bulb



Up and Down Reader

(also thermister) inputs. Because of its small size it requires very little room on a panel board. Its 6-inch vertical scale with 1 per cent graduations and readability to ½ per cent is well illuminated. It is servo-driven and because of this is claimed to be much more accurate and positive than a meter type instrument. The semi-null balance circuit minimizes voltage variation and does not require sola or other line voltage stabilizing devices. A "fail safe" feature permits the pointer to drop to zero when the amp fails or when the Atcotran differential transformer circuit opens up.

E—1021. Low Foaming Spray Cleaners—Northwest Chemical Company, Detroit, Mich., has developed a new series of high efficiency spray cleaners to be called "Jet" cleaners. These new cleaners thoroughly remove all types of production soil from zinc, copper, brass and steel.

An unusual feature of the new cleaners is their low foaming action, even under conditions of high pressure and turbulence, hence a wider range of concentration can be used. Drain loss is cut to a minimum and greater operating economy is assured.

Low foaming also permits the cleaner to carry a heavier dirt-load without redeposition and without the use of silicones or other hard-to rinse chemicals. Jet cleaners are non-toxic, harmless to racks and equipment, have no disposal problems and are dustless and non-caking.

20 SECONDS...
Or Around The Clock!

The ROHCO® INTERMITTENT-FLOW ADDITION AGENT PUMP IS AN INDISPENSABLE AID TO EVERY PLATING SHOP...

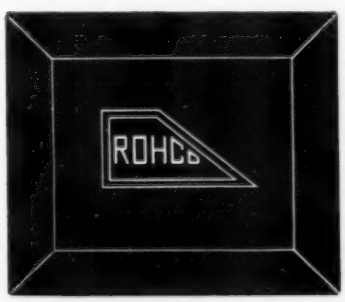
Here's a new, unique addition agent pump with rapid, accurate fingertip adjustment for any desired duration of flow. An electric timer automatically operates the pump once every hour for any desired interval of time from 20 seconds to continuous. Capacity 1½ ounces up to 30 gallons per hour at 30 foot head.

Extremely long life. Self priming. Pumps slurries as well as most corrosive liquids. No metal parts in contact with solutions. One hour cycle timer. Available with 110 or 220 volt single phase motor, as specified. Priced so low you can't afford to operate without it.

LOOK At Some of the Advantages!

1. Diminishes human element in replenishing addition agents.
2. Keeps additions at a minimum—maintains addition agents at a constant optimum concentration level; eliminates excessive additions.
3. Helps to achieve uniformly high quality of plating with fewer rejects.
4. Applicable to waste disposal treatment and other pumping operations.

ORDER YOURS TODAY FROM YOUR NEAREST ROHCO DISTRIBUTOR OR STOCK POINT!



R. O. HULL & COMPANY, INC.

1301 Parsons Court Rocky River 16, Ohio

DISTRIBUTORS and STOCK POINTS: CHICAGO, ST. LOUIS, Ardco, Inc. • TORONTO, CANADA, Armalite Company, Ltd. • LOS ANGELES-SAN FRANCISCO, Crown Chemical & Engineering Co. • NEW ENGLAND, NEW YORK, PENNSYLVANIA, Enthone, Inc. • MINNEAPOLIS, W. D. Forbes Co. • BINGHAMTON, Austin F. Fletcher, Inc. • OREGON, WASHINGTON, Great Western Chemical Company • DALLAS and DAYTON, R. O. Hull & Company, Inc. • DETROIT, George L. Nankervis Co. • ATLANTA (and SOUTHEASTERN STATES), Atlantic Chemical & Equipment Company.

FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE A 1033.

EQUIPMENT & SUPPLIES

E—1022. Solvent Detergent—Oakite Composition No. 117, a solvent detergent which combines thorough cleaning ability with safety factors, has recently been introduced by Oakite Products, Inc., manufacturers of industrial cleaning materials.

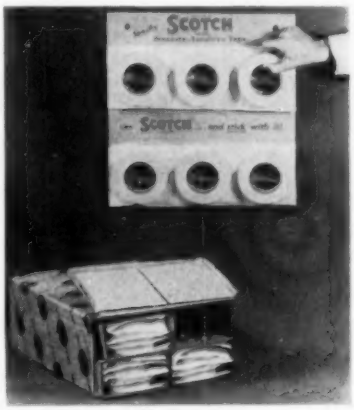
A clear solvent designed to remove grease, oil, and smut from machinery where water cannot be used, Oakite Composition No. 117 is equally effective in cleaning electrical equipment, diesel cabs, and engine compartments. The new material has a flash point of 185°, Cleveland open cup.* It has an exposure tolerance rating two and a half times greater than trichlorethylene and twenty times that of carbon tetrachloride.

Oakite Composition No. 117 is used full strength, applied by brush, or immersion, or a non-atomizing spray. No rinse is necessary—parts may be blown dry with compressed air. For certain uses it is possible to use the material diluted with up to equal parts high flash petroleum distillate.

E—1023. Vapor Degreaser—The R. W. Legler Plating Works of Erie, Pa., have announced the J. M. J. Waterless Vapor Degreaser. The compact machine uses no water, saves appreciably on solvent, requires only one man for operation and is completely automatic. The degreaser has vapor control by refrigeration and a stainless steel vapor jacket.

E—1024. New Package—A new bulk shipping carton containing four individual "Rak-A-Tape" packages has been announced by Minnesota Mining and Manufacturing Co., St. Paul, for its line of "Scotch" brand pressure sensitive industrial tapes.

The new packaging technique, which features unitized packaging, better protection for rolls and easier display of merchandise, is effective immediately for most "Scotch" brand masking and filament tapes.



Unitized Packaging

The 3M company said that its other industrial tapes also will be packaged in the new "Rak-A-Tape" bulk cartons by the the end of this year.

New bulk cartons also are equipped with a tear strip opener. The user simply pulls the end of a specially positioned strip of filament tape—and the top opens on three sides.

Each master carton contains four separate, re-shippable "Rak-A-Tape" packages of industrial tape holding various quantities of tape rolls (quarter carton) depending on the roll size.

E—1025. Corrosion Preventive—Dearborn Chemical Company, Chicago, has announced the development of a new, water-based, non-flammable corrosion preventive for the protection of metal surfaces.

The new product, No-Ox-Id Safegard, is a water emulsion of waxes and oils in combination with selected corrosion inhibitors which, when applied to metal surfaces, provides an excellent, highly protective film. When applied by dip or spray, No-Ox-Id Safegard forms a uniformly firm, wax-type coating. After a brief drying and curing period, this coating cannot be reverted to emulsion, nor will it wash off during outdoor exposure. It is extremely adherent and is not appreciably affected by handling. It is non-inflammable.

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BUCKY
"BUCKY" offers you FREE!
a TRIAL BAR of
K260G
STAINLESS STEEL BUFFING COMPOSITION
OUTSTANDING FOR CUT AND COLOR WHEN USED WITH
SISAL BUFFS
REPRESENTATIVE IN MAJOR CITIES WRITE DEPT. A FOR SAMPLE
The BUCKINGHAM PRODUCTS CO.
POLISHING and BUFFING COMPOSITIONS
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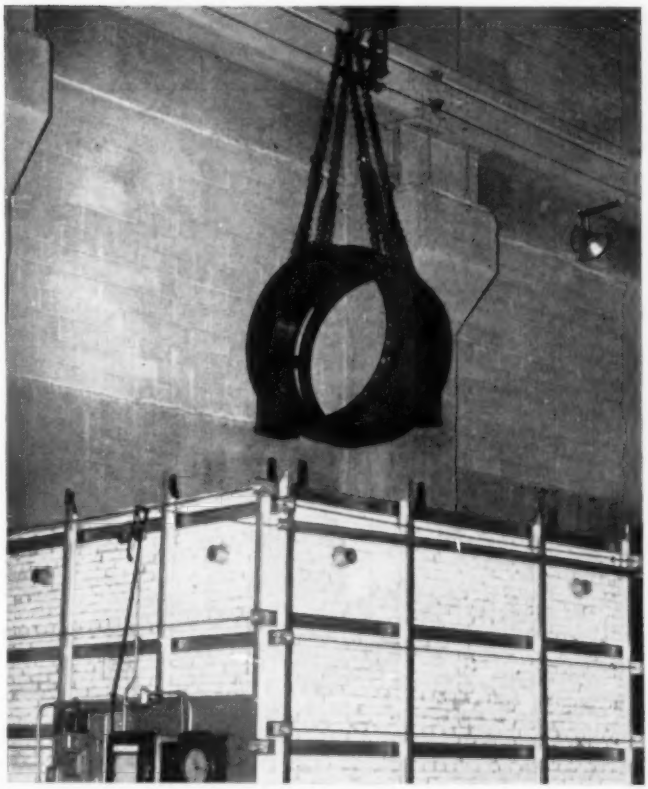
Hot Time...

assures you a long-time trouble-free source of low-voltage dc power

Chandeysson

NORMALIZES COLD-ROLLED FRAMES AND WELDS BY SPECIAL ANNEALING



This massive Chandeysson generator frame is being lowered into a specially designed furnace for heat treating. This annealing stress-relieves the cold-rolled steel frame and all welds. Superior and uniform electrical characteristics result in sparkless commutation, lower brush wear, and higher efficiency...even after years of rugged use. The most modern manufacturing methods are used in every step of making a Chandeysson Motor Generator. Unified responsibility for the manufacture of every component...from selected raw materials to the finished product . . . is in the hands of skilled men with decades of experience in building low-voltage generators. Our aim in engineering is to *prevent* design defects . . . rather than to correct for them. This is why more and more "Industry Leaders Choose Chandeysson!"

MAKE US PROVE to you that a Chandeysson Motor Generator set is your most economical and dependable source of low-voltage dc current. Mail this coupon today.

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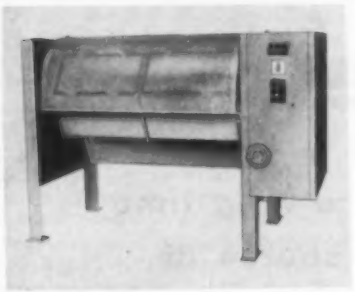
EQUIPMENT & SUPPLIES



V-8 with Rear Motor

E—1027. Redesigned Barrel Finisher—For greater convenience and visibility Rampe Manufacturing Co., Cleveland Ohio, has redesigned Model V-8 Barrel Finisher. The motor is now located at the rear of the machine where it is protected from water splash. The speed control handle is conveniently located at the front of the machine.

Another improvement is the use of a heavy wire mesh guard instead of a solid sheet metal guard in front of the barrels. This guard lifts up and back for easy access to the barrels.

Model V–8 Barrel Finisher has a total capacity of 8 cubic feet available in any interchangeable combination of 2, 4, 6 or 8 cubic feet barrels. Power is furnished by a 1½ hp magnetic brake motor with jogging and reverse switch. Other specifications include: Variable speed drive; waterproof start-stop switch mounted in the front panel; and anti-friction bearings. Barrels can be furnished with the well proven No-seam vinyl plastic lining which gives extra wear and chemical resistance.

FORMAX

the Perfect Combination

FROM START TO FINISH

ZIPPO CLOTH BUFFS

These famous long-wearing buffs run cool under all buffing conditions. High count bias-cut cloth is assembled on ventilated steel centers. Each section is perfectly balanced and faced—requires no raking.

BUFFING COMPOUNDS

Formax produces a complete line of buffing compounds in bar, tube and liquid form.

Our extensive manufacturing, laboratory and testing facilities are at your disposal.

ZIPPO SISAL BUFFS

You have a pleasant surprise coming if you haven't tried the new Zippo bias-type sisal buff. It was specifically developed for steel buffing—to blend polishing grit lines—to cut down stainless steel—and bring up a bright lustre.

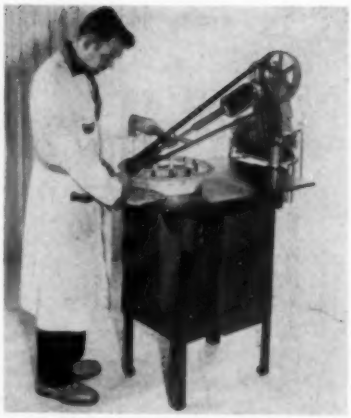
Other Formax products include the well-known C-20 Flexible Contact Wheels and F-26 Abrasive Belt Grease Stick.

Descriptive Catalogs Sent on Request

FORMAX MFG. CORP.

DETROIT 7, MICHIGAN

"THE FOUR McALEERS"



Forward and Backward

E—1028. Swing Sander—A new Model S–90, swing sander has been announced by Bush Mfg. Co., of Clawson, Mich. It has a working height of 42 inches and a table 24 inches x 32 inches. It is equipped with a ¾ hp 115–230 single phase or 220–440 three-phase 60 cycle 1750 rpm motor. The tension arm and abrasive belt drive pulley freely reciprocate in forward and backward motion under balanced spring controls. An automatic tension arm instantly compensates for belt stretch.

Collapsible

E—1029. Materials Racks—Lightweight, but strong and durable, E. H. Titchener & Co. introduced new wire racks that are collapsible for easy, compact storage. Used for transporting components from one processing unit or machine station to another, they require a minimum of floor space when not in actual use. Collapsible design also reduces packaging and shipping expense.

E—1030. Waterproof Cloth Tape—A new multi-purpose colored waterproof cotton cloth tape has been developed by the Permacel Tape Corp. in New Brunswick, N. J.

Designated Permacel 68, the new pressure sensitive tape combines excellent tensile strength with a high degree of moisture resistance. Average values are: Adhesion 40 ounces per inch of width to plastic, and 32 to steel; Tensile strength 60 pounds per

3 STANDARD SHAPES

"RECTANGULAR"

"TEAR DROP"

"DOG BONE"

NEW!

SHAPED, EXTRUDED APW SILVER ANODES

CONTROLLED GRAIN SIZE: APW EXTRUSION PROCESS* controls grain size within definite limits—minimizes sheddings

ROLLED FLAT PLATE ANODE SECTION: Photomicrograph illustrates highly irregular, uncontrolled grain size—a major cause of shedding and rough electrodeposits.

*Pat. Pending

The three standard shapes of APW Extruded Anodes were developed to extend the useful life of anodes—*to lower plating costs!*

Through scientific design, the distribution of mass material helps to maintain a more efficient ratio between anode weight and active surface area. After 85% by weight has been plated off, this APW anode *retains 80% of its original active surface area!* You profit three ways with longer anode life, minimized polarization and less silver scrap to be refined.

Another equally important advantage of the new APW Extruded Anode is the small, uniform grain size—*controlled between definite ideal limits!* As a result, corrosion is smooth and uniform for consistently smooth electrodeposits. Shedding is virtually eliminated—rejects are a comparative rarity!

To be certain the silver you buy in anodes is used most efficiently, APW will develop special anode shapes to meet particular plating bath conditions. We'll be glad to assist with your anode problems.

APW EXTRUDED ANODE SECTION: Note small, fully controlled regularity of grain size to promote uniform corrosion, smoothest electrodeposits and less rejects.

293

THE AMERICAN PLATINUM WORKS

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APW

ENGELHARD INDUSTRIES

inch of width. Permacel 68, for color identification applications, is available in red, black, white, brown, yellow, dark blue, light blue, green, pink and olive drab.

E—1031. Cadmium Plating Products—R. O. Hull & Company, Inc., manufacturers of plating specialties, announce four new products for improved cadmium plating.

Super XL Cadmium Brightener (liquid or powder) is an addition agent for cyanide cadmium plating and according to the manufacturer, produces the clearest, brightest barrel or still cadmium plate yet seen. Only small amounts are needed in the bath. In addition to brightness, Super XL minimizes cadmium usage by improving uniformity of deposit with fastest production.

Cad-Sol is a pure, concentrated solution of cadmium cyanide for make-up or maintenance of cadmium plating baths without the troublesome and usually wasteful task of trying to dissolve cadmium oxide.

Cadip is used in small additions to the final hot water rinse to speed drying and to prevent discoloration of cadmium deposits, especially upon baking to relieve hydrogen.

Rodip CD-3 and CD-4 are single, short-dip chromate post-plating treatments without leach, for long-lasting, brilliant cadmium with good corrosion protection. CD-3 is formulated especially for use in automatic tank or barrel installations and CD-4 is for manual operations.

E—1032. Hose for Shot Blasting and Shot Peening—Foundries, metal finishing plants and other activities using blast cleaning or shot peening should select hose with particular care according to engineers

Shot Hose

of the Thermoid Co., Trenton, N. J.

When sand is used for cleaning metal and other surfaces, the number one enemy of hose is abrasion. The tube should be composed of pure gum rubber so that the sand particles will bounce off. A static wire will control static electricity.

When using metal shot, the greatest hose destroyer is static electricity. If not controlled the electricity will generate high voltage potentials which will burn through the tube and wall. The tube must, therefore, be compounded to conduct and dissipate electricity.

When both sand blast and shot blast or shot peening are used in the same shop, the hose should, of course, not be interchanged.

E—1033. Compact Dust Collector—A new, square-type, portable DusKolector has been announced by Hammond Machinery Builders, Inc., of Kalamazoo, Mich., specialists in grinding, polishing, and dust collecting machines since 1882.

Known as the Model 40, using a ½ hp motor, and mounted on casters for easy portability, the new dust collecting unit is said to be ideal for capturing dust from medium size grinding equipment and to perform efficiently with drill presses, lathes, milling machines, surface grinders, etc., when these tools are used for high speed machining of cast iron.

The new Model 40 DusKolector is described as low in cost, compact, efficient, and requiring a minimum of space. It can be "tucked in" around machine tools. Cabinet size is 25 inches x 22 inches x 28 inches. Shaft with hand knob provides convenient means of "shaking" filters for cleaning, and without removing them from cabinet. Front panel easily removed for access to replaceable fiber glass filters and dust pan in bottom of cabinet.

With two inlets, the Model 40 has a capacity of 700 cfm, and can be used with two size 16 inch x 2 inches grinding wheels or two 4 inch wide abrasive belts. Advantages claimed are protection of the operator and of nearby tools from abrasive dust, reduction of cleaning and maintenance time, longer tool life, and rapid repayment of the original investment.

Check plating thickness
WITH THE
KOCOUR
ELECTRONIC
THICKNESS
TESTER*
*Anodic
Solution
Method
6 Simple steps . . .
to quick, accurate results
1.
MOUNT THE CELL . . . on the spot to be tested and clip lead wire to specimen.
2.
ADD TEST SOLUTION . . . which corresponds to the type of plating and base metal tested.
3.
PLACE STIRRER IN POSITION.
4.
SET SELECTOR SWITCH to the type of plating to be tested as indicated on panel.
5.
PRESS THE TEST BUTTON to start the test . . . and upon completion the unit shuts off automatically.
6.
TAKE THE READING directly from the counter on panel i.e., (.0004").
TOTAL TIME . . . less than 2 minutes
+ plus
these features
• DETERMINE THICKNESS OF
decorative chromium
heavy chromium
silver
tin
cadmium
zinc
lead-tin alloy
tin zinc alloy
copper
brass
nickel
lead
on various base metals and materials.
• WIDE THICKNESS RANGE
• DIRECT READINGS
• 90-95% ACCURACY
• TESTS ARE RAPID
• VIRTUALLY AUTOMATIC
• ELIMINATES HUMAN ELEMENT
Don't delay! See how the Electronic Thickness Tester can solve your problem. Write for literature today.
KOCOUR CO.
Chemistry Control for the Plating Industry
4801 S. St. Louis Avenue
Chicago 32, Illinois

E—1034. Water Fire Extinguisher—A new stored-pressure water fire extinguisher has been introduced by Ansul Chemical Company, Marinette, Wis., pioneer manufacturer of dry chemical fire extinguishing equipment.

The extinguisher has a 2½-gallon capacity. Underwriters' Laboratories has classified the unit 2-A, the highest rating given to extinguishers of this capacity for use on Class A (wood, paper, rags, etc.) fires.

An important feature of the new unit is its shut-off control. The operator is able to turn off the water at will, thereby reducing water damage to a minimum and allowing most efficient use of the water contained in the unit.

No bouncing or inverting is needed to activate the extinguisher. The stream of water is released by merely operating the squeeze grip carrying handle. The water stream, supplied by full capacity air pressure from start to finish, has a range of 35 to 40 feet.

After use, the extinguisher can be quickly recharged by replacing the water and pressurizing the unit to 100 lb/sq in at any source of compressed air. A tri-color pressure gauge tells at a glance whether the air pressure is adequate to discharge the unit effectively.

When anti-freeze chemical is added, Ansul's new water fire extinguisher will operate properly in temperatures down to -40°F. It is available in three different shells—stainless steel, brass and chromium plated brass.

Half-Scale Model

E—1035. New Multi-Barrel unit—A new multi-barrel finishing unit, first previewed at the ASTE Industrial Exposition, is now in production for prompt delivery by the BMT Manufacturing Corp., originators of the multi-barrel, slide-honing principle for precision barrel finishing of metal and plastic parts. Named the Model MMB, the unit is reported to eliminate expensive and time consuming hand finishing methods.

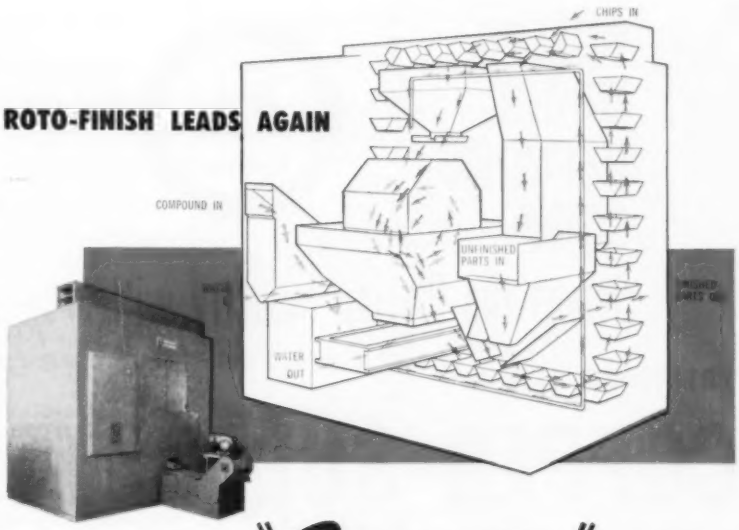
The company describes the new unit as a half-scale model of their famous standard multi-barrel unit. As many as ten finishing barrels, 3 inches to 8 inches in diameter, can be mounted on the 24 inch revolving disc of the new model. Several finishing operations can be conducted simultaneously, using several barrels with different combinations of parts, media, and compounds. As the disc revolves, parts are subjected to a simultaneous rotary, centrifugal, and slide-honing action, not just conventional mass-weight tumbling.

The Model MMB Multi-Barrel unit features a variable speed drive from 15 to 45 rpm, with forward and reverse control, and an automatic electrical safety switch for the front guard. When the guard is lifted from the front of the machine, the unit automatically stops.

E—1036. Flexible Shelving—A new kind of shelving which can be built to fit the user's particular needs is announced by The Frick-Gallagher Mfg. Co. of Wellston, Ohio. Called "Quick-Bilt" Shelving, it is easily assembled and easily rearranged for flexible storage requirements.

Starting with a Basic Unit, consisting of base shelf, top shelf, back panel and two end panels, the user slides in as many shelves as needed, selects the required number of dividers from four sizes offered, snaps them in place, and the unit is ready for use.

ROTO-FINISH LEADS AGAIN



the new "Rotomation" MACHINE

MAKES MECHANICAL TUMBLING A FULLY AUTOMATIC BARREL FINISHING PROCESS

- Completely Automatic
- Needs no operator in attendance
- Loads and unloads itself with each cycle.
- Cycle variable for different part requirements.
- Provides continuous operation
- Assures uniformity of finish
- Low cost operation — high production
- Complete package unit
- Simple to install . . . Electric, water, air and drain connections only.
- Suitable for straight line production.
- Thus, "Rotomation" barrel finishing machine becomes a machine tool.

Roto-Finish COMPANY

3703 MILHAM ROAD, KALAMAZOO, MICH.

P. O. Box 988 – Phone 3-5578

ORIGINATORS OF THE ROTO-FINISH PROCESS

BOOKS

The Chemistry of the Coordination Compounds (ACS Monograph No. 131) edited by John C. Bailar, Jr. 844 pages; $18.50; AES members, $15.50

One of the great achievements of modern chemistry has been the development of the theory and the practical applications of coordination compounds (also commonly known as Werner complexes, chelating agents and sequestering agents). Recently, progress reports on these compounds have become so varied and numerous that even specialists cannot keep abreast of them.

This book offers a highly authoritative, critical review of the entire subject. Twenty-four experts, each known for his original investigations of coordination problems, have contributed carefully balanced discussions.

More than 3,000 references offer ready access to the entire body of published literature on the subject. This is an indispensable addition to the reference shelf of every metallurgist.

The Condensed Chemical Dictionary (New Fifth Edition) completely revised and enlarged by Arthur and Elizabeth Rose. 1220 pages; $12.50; AES members, $10.50.

This dictionary offers a vast fund of information for everyone requiring quick, accurate data on chemicals, chemical terminology, trade-name products and related substances.

Now with over 30,000 entries the new Fifth edition is the most complete reference book of its type. It is a practical book for busy chemists, engineers, consultants, purchasing agents, executives, manufacturers.

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Elevated-Temperature Properties of Coppers and Copper-Base Alloys (ASTM Special Technical Publication No. 181). 8½ by 11; heavy paper cover; 248 pages; $5.50; AES members, $4.95.

Another of a current series of reports prepared under the auspices of the Data and Publications Panel of the ASTM-ASME Joint Committee on the Effect of Temperature on the Properties of Metals, this report is primarily a graphical summary of the elevated temperature data for coppers and copper-base alloys. Data for the coppers are limited to the wrought materials, while the data for the alloys apply to cast and wrought materials.

Graphical data includes modulus of elasticity, tensile strength, yield strength (0.5 per cent extension and 0.2 per cent offset) reduction of area, elongation, stress for creep rates of 0.000001, 0.00001, and 0.0001 per cent per hour and stresses for rupture in 100, 1000, 10,000, and 100,000 hour.

Included in the Appendix are data sheets giving the original data for drawing curves. Also included are data sheets giving insufficient information for plotting or of such a nature as not to justify plotting, but meriting inclusion on the basis of contributing to the limited information available on many of the coppers and copper-base alloys. The data sheets also give chemical composition shape, sizes and processing information.

The book was prepared for the panel by Clair Upthegrove and Henry L. Burghoff.

ASTM Standards on Copper and Copper Alloys. 654 pages; 6 x 9; heavy paper cover; $5.75; AES members, $5.20.

All of the ASTM Standards pertaining to copper and copper alloys, which were developed by ASTM Committee B-5 on Copper and Copper Alloys, Cast and Wrought, and related standards developed by Committees B-1 on Wires for Electrical Conductors and B-2 on Non-Ferrous Metals and Alloys, have been compiled into a compact, handy volume. The December, 1955, edition of ASTM Standards on Copper and Copper Alloys includes in their latest form 127 ASTM Standards—110 specifications, 12 test methods, 2 recommended practices, 2 classifications (of coppers and copper-base alloys), and 1 definition of terms.

Standards cover copper, copper-alloy, and copper-covered-steel electrical conductors; copper and copper-alloy plate, sheet, strip, and rolled bar; copper and copper-alloy rod, bar, and shapes, and die forgings; copper and copper-alloy wire; copper and copper-alloy pipe and tube; copper-alloy ingot; copper-alloy castings; copper and copper-alloy filler metal; and methods of test for copper and copper-alloys.

Brighter Plating for You at Lower Cost with these Du Pont Products...

"Cadalyte" Cadmium Plating Salts

The complete cadmium plating salt, designed to simplify the production of any type of cadmium plating. Produces deposits of extreme brightness and uniformity over a wide range of operating conditions with a minimum amount of attention.

"Coppralyte" Copper Plating Salts

Sodium Formulation and Potassium Formulation — are high-purity, readily-soluble salts containing the correct proportion of ingredients for make-up and maintenance of "Coppralyte" baths.

"Durobrite" Addition Agent 309

A low cost brightener for use in cyanide zinc solutions giving bright, attractive coatings over a wide range of current density. Used in still and barrel plating, it produces high purity deposits highly suitable for use with chromate conversion coatings.

"Zin-O-Lyte" Plating Chemicals

Widely used for low-cost bright zinc plating of all types of steel. High purity, ready solubility and uniformity, make them ideal materials for production of brilliant, rust-resistant zinc deposits directly from the bath —*without bright dipping.*

...AND EXPERT TECHNICAL ASSISTANCE

You'll find Du Pont's technical assistance one of the most important means at your disposal in producing brighter plating. Whether it's on-the-spot technical service, product literature, or laboratory research, Du Pont has ready facilities to answer your need.

Du Pont Technical Service

In each area, practical plating men are available to give immediate technical assistance. These men have the experience to help you with your operating problems.

Detailed Technical Literature

Operating manuals for economical processes, preparation, and maintenance of plating baths.

Research and Application Laboratories

For help with the more difficult, or unusual problems.

Whether you use barrel, still, semi-automatic or full automatic equipment, Du Pont's long experience in the plating field can be of help to you. The coupon below will bring full details on how you can take advantage of Du Pont's Brighter Plating Service.

ELECTROPLATING

Chemicals · Processes · Service

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Better Things for Better Living
...through Chemistry

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Electrochemicals Department • Wilmington 98, Delaware

☐ Please have a Du Pont Representative call regarding a free survey of my operation. ☐ Send the following books:

☐ "Cadalyte" ☐ "Coppralyte"
☐ "Durobrite" ☐ "Zin-O-Lyte"

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BOOKS

Panel Discussion on Pyrometric Practices (ASTM Special Technical Publication No. 178). 78 pp.; heavy paper cover; 6 x 9; price, $1.50; AES members, $1.35.

Much interest centers in defining the precision of temperature measurement and control which can be recommended or specified in high-temperature test work. The Panel Session, organized by the Test Methods Panel of the ASTM-ASME Joint Committee on Effect of Temperature on the Properties of Metals, discusses work in this field, and is concerned with the ASTM recommended practices on high-temperature testing of metals, E 21, E 22, and E 85. The session was held at the ASTM Annual Meeting, June, 1955. The Introduction was by J. W. Freeman, University of Michigan, and papers included are:

"Thermocouple Immersion Errors," by J. M. Berry and D. L. Martin, General Electric Research Laboratory, Schenectady, N. Y. "Summary of Pyrometric Procedure Employed by One Company in Creep-Rupture Testing and An Analysis of Results Obtained," by W. E. Leyda, The Babcock & Wilcox Co., Alliance, Ohio. "Creep and Rupture Test Pyrometry," by Charles R. Wilks, American Brake Shoe Co., Mahwah, New Jersey.

ASTM Publishes Its 1955 Volume of Proceedings

The 1955 edition of the ASTM PROCEEDINGS has recently been published. The 1264-page volume records the technical accomplishments of the American Society for Testing Materials for the year 1955. It includes many technical reports and papers together with discussion which has been offered to the Society during the year and accepted for publication in the PROCEEDINGS.

Leading the volume is the Summary of the PROCEEDINGS of the 58th Annual Meeting, held in June 1955, listing by title and author the program for each of 32 sessions. The Annual Address by President Norman L. Mochel, entitled "What Is It?" speaks of the pressing need for individual identification of materials and products, especially those which look alike but differ widely in strength and other important properties.

Reports of the technical committees, of which there are 70, and their appendices provide a wealth of useful technical information as do the 34 technical papers and discussions on a wide variety of subjects pertaining to research and testing of materials.

In addition to the papers and reports embodied in the PROCEEDINGS, there are listed in the table of contents all symposiums published separately as Special Technical Publications (STP's) and all papers published in the ASTM Bulletin.

Industrial Engineering Handbook, Harold B. Maynard, Editor-in-Chief. 1504 pages; 648 illustrations; $17.50; AES members, $15.00.

A broad, authoritative treatment of the whole field of industrial engineering is now made available in this handbook of principles, data, methods, and procedures. Scores of experts, working under the editorship of one of the most distinguished leaders in the field, have each contributed a measure of their experience on such diverse topics as the industrial engineering function, work measurement, predetermined elemental time standards, wage payments, plant facilities and design, and control procedures.

Factual and how-to-do-it in approach, the book covers many practices, from such long-accepted techniques as time and motion study to such developments as automation and linear programming. Both procedures used directly by the industrial engineer, and such related ones as quality control and tool and gauge design, are covered. The human and industrial relations of industrial engineering are stressed throughout the book.

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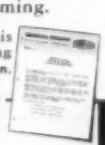

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Practical Aspects of Cadmium Plating

By John Kosmos*

Cadmium is a soft malleable white ductile metal. It weighs 8.642 times as much as water, melts at 320.9° C and boils at 767° C. This metal is suitable for plating purposes because it resists alkali attack better than other metals, will not oxidize readily at room temperatures, solders relatively easily, and requires very thin deposits for adequate protection of steel against corrosion. It is superior to most metals as a base for organic finishes and has an attractive appearance.

The usual thicknesses for adequate protection of steel are as follows:

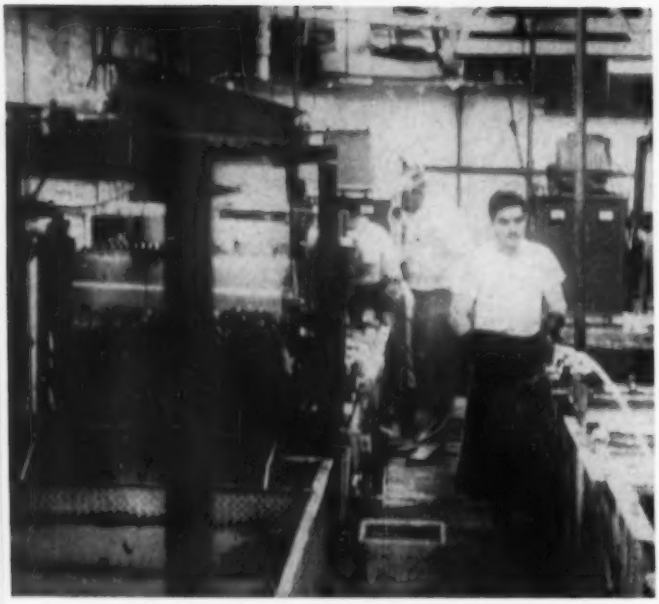
a. For light duty—0.00015 inch (for internal component parts or indoor protection)
b. For medium duty—0.00030 inch (for adequate protection indoor or out)
c. For heavy duty—0.00050 inch (where severe atmospheric conditions are encountered)

*President, Kosmos Electro-Finishing Research Inc., Belleville, N. J.

Cadmium is usually preferred by the electrical industry because it has good solderability as well as low contact resistance. It minimizes local cell formation where dissimilar metal assemblies are involved such as iron and copper or brass, thus minimizing corrosion by galvanic action. Since the bulk of cadmium plating is done by the cyanide solution and since the conventional baths tend to deposit atomic hydrogen with the cadmium, which causes embrittlement of the basis metal, plated parts are baked from 1 to 4 hours at temperatures of 300–400° F to relieve the hydrogen embrittlement whenever it is detrimental to the function of the parts.

Although hydrogen embrittlement is a deterrent, cyanide cadmium plating is preferred to other baths because of its good throwing power, fine-grained deposits, lustrous and uniform appearance, particularly when addition agents are used and, most important, its wide plating range and ease of maintenance.

Internal parts such as "Hopalong Cassidy" six shooters used by the younger set need a uniform, lustrous, lasting, gleaming appearance to satisfy the critical judgment of the users



A typical, though unorthodox, cycle consisting of metal preparation and plating as practiced by Ace Plating of Los Angeles . . . and still the cadmium plate is good!

All sizes, shapes and forms are tumble finished. Rowe Mfg. of Whippany, N. J. produced the parts shown above in multitudes at low cost. They are parts for vending machines which take a terrible beating, but must be dependable. They are plated in large quantities

The usual constituents of a cadmium plating bath are as follows:

For Still Plating

Cadmium Oxide	3.0– 5.2 oz/gal
Sodium Cyanide	11.5–17.5 oz/gal
Cadmium as metal	2.5– 4.5 oz/gal
Brightener	As required

For Barrel Plating

Cadmium Oxide	2.7– 4.5 oz/gal
Sodium Cyanide	8.8–15.0 oz/gal
Caustic Soda	1.0– 1.5 oz/gal

From the above formulations, it is noted that there is a great deal more cyanide used for an equal amount of cadmium. The following equation helps to explain this to a certain degree when cadmium oxide is used:

Mol Wt: 128 196 80

Chemical Equilibrium Formula: $CdO + 4NaCN + H_2O \rightarrow Cd(CN)_2 + 2NaCN + 2NaOH$

Since one part of cadmium oxide requires 4 parts of sodium cyanide and since the combining weights are as shown above, for every pound of cadmium oxide that is put in solution, 1.53 pounds of sodium cyanide is needed to combine. Also, from the equation, it is apparent that for every pound of cadmium oxide that is put in solution with sodium cyanide there is formed 0.625 pounds of caustic soda. Since the concentration of caustic soda is to be limited, care should be taken not to use cadmium oxide indiscriminately to replenish the metal in the bath.

When cadmium cyanide is available, the cadmium cyanide electrolyte may be as follows:

Cadmium Cyanide	6.0 oz/gal
Sodium Cyanide	8.0 oz/gal
Caustic Soda	2.0 oz/gal

The ultimate composition of the bath is very much the same as the one made by the cadmium oxide formula.

The cyanide bath is by no means the only reliable bath that could be used for the purpose. The fluoborate bath is reputed to have superior stability, long life, a cathode efficiency of almost 100 per cent and causes hardly any hydrogen embrittlement. One such formulation is as follows:

Cadmium fluoborate	32.2 oz/gal
Cadmium as metal (equals)	12.6 oz/gal
Ammonium fluoborate	8 oz/gal
Licorice	.134 oz/gal
Operating conditions	*p*H 4.0–4.6
Temperature	70–100° F
Cathode current density	30–60 amp/sq ft
	4–6 volts

The bath is preferably agitated. The anode to cathode ratio is 2 to 1 using pure cadmium anodes. To suppress the *p*H, fluoboric acid is used and to raise it, concentrated ammonia is used.

One disadvantage of this bath is its poor throwing power.

Cadmium plating could be very expensive or very economical if the desired formulation and operating conditions are carefully adhered to for the specific application. For instance, consider barrel plating operations of cupped parts which drag-out from the bath considerable amounts of electrolyte. If the concentration of the bath is high in cadmium, the waste due to drag-out would be very expensive. On the other hand, where speed of plating is of paramount importance, particularly for such operations as automatic equipment which are limited by the nature of existing standards, a carefully controlled high concentration of cadmium metal would be ideally suited. Such formulations of balanced bath for usual cadmium plating conditions practiced by American cadmium platers are as follows:

Cadmium metal	2–3 oz/gal
Total sodium cyanide	10–15 oz/gal
Caustic soda	1½–2½ oz/gal
Sodium Carbonate	6–12 oz/gal (preferably the lower)

With the higher concentration preferred for barrel plating operations only.

Sodium carbonate is not usually added when the bath is made up new but is formed during the operation of the bath. For most applications, 8 oz/gal should be the maximum concentration at which this component may be present in the bath. The temperature of the bath should be 75 to 85° F and the *p*H 12 to 13 measured electrometrically. The *p*H may be adjusted using caustic soda if this component is not above 2.5 oz/gal. The proper amount of addition agent should be used and controlled by such methods as the Hull Cell or the Bent Cathode Cell for uniform and bright deposits.

Sodium cyanide and caustic soda are important in cyanide cadmium plating, the former to provide conductivity, improve anode corrosion and provide the cadmium ions which ultimately are deposited on the cathode. The latter provides conductivity particularly in tumble plating operations. Addition agents used in cyanide cadmium plating are of two classes:

a. Organic, (nitrogen containing compounds) such as piperonal, some sulfonic acids, dextrine, glue, molasses and some caffeine-bearing complexes.

b. Metallics, such as nickel cyanide, cobalt as the sulfate, and selenium are the most commonly used inorganic addition agents. Of late, molybdenum has also been used. Care must be taken in using these inorganic compounds lest they cause irregular deposits and suppress the cathode current efficiency.

Many factors determine the cathode current density used in cadmium plating. The most common are:

a. The bath composition.

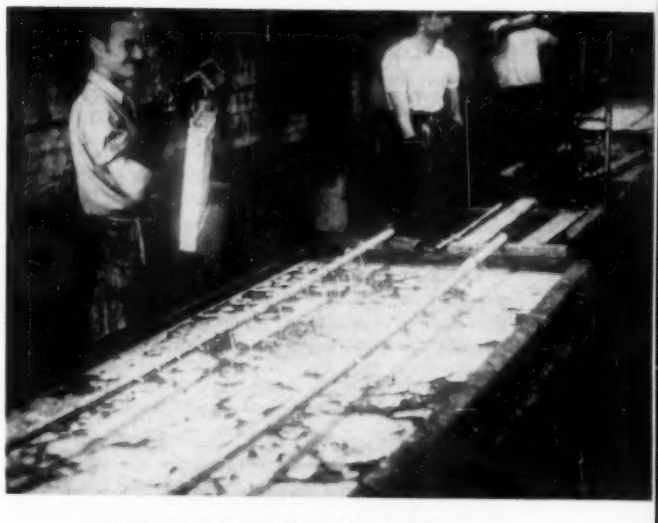
b. Agitation of the solution.

c. Temperature of the bath.

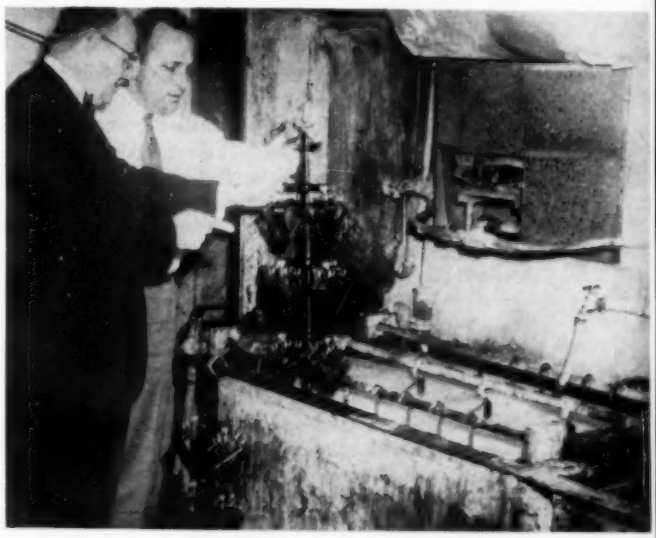
d. The kind and concentration of the addition agent used.

e. The shape and appearance of the parts plated.

To conform with some of the optimum operating conditions, an anode current density of about 20 amp/sq ft is



Wayne Polishing and Plating Co. of Los Angeles introduced these ideal plating conditions: They submerge the anode bars for positive contact; they use a polyester bonded fibreglas tank so as not to have any stray currents that may interfere. All that is apparent at the surface is the gaseous reaction of electrolytes and by-products of the addition agents used. Howard Matthews, manager, produces innumerable cadmium plated parts to accurate specifications with meticulous use of excellent equipment



At Rowe Mfg. Tom Austin, who has a ready ear to listen or a chance to improve his already excellent electrodeposits, is seen here lending an ear. John Banta of Oakite Products Corp. is seen above (left) giving pointers on cleaning methods prior to the electrodeposition of cadmium

desired. This point of view is taken when we consider that the cathode current density is usually about 30 to 60 amp/sq ft for still plating. This is because an anode to cathode area ratio of 1 to 3 is required, to maintain a uniform corrosion for replenishing the bath with cadmium ions, since a normal bath contains 2.5 to 3.0 oz/gal cadmium metal. Along with other operating conditions for optimum operation, the temperature of the bath limits should be adhered to since the temperature increases for a given voltage the cathode current density increases due to increased conductivity of the solution. Also, the cathode efficiency increases, but, the crystal size also increases, thus causing irregular and rough deposits. The opposite, of course, is true when the temperature is decreased.

The anode efficiency of cyanide cadmium baths is about 100 per cent, whereas the cathode efficiency is only about 90 per cent plus or minus 5 per cent.

So far as the cathode efficiency of the bath is concerned, as the metal content, temperature, agitation increases, the cathode current density increases and the cathode current efficiency increases. Conversely, high cyanide content, high brightener content, low caustic soda and low temperature cause a decrease in cathode current efficiency.

As mentioned above, one of the important properties of cyanide cadmium plating is its good throwing power. Some factors which affect this property are as follows:

a. As the metal content increases, the throwing power decreases.

b. As the cyanide increases, the throwing power increases.

c. As the current density increases, the throwing power increases.

d. Addition agents, agitation, and low temperature to a certain degree cause increase in throwing power.

Trouble shooting is of paramount importance in cadmium plating. Such troubles as pitted deposits are caused by poorly prepared basis metal, high current density, contamination by such metals as thallium from the anodes. This condition may be remedied by the addition of small amounts of sodium alkyl aryl sulfonic acid. Hydrogen peroxide may also be used for the purpose, but its use would also destroy such addition agents as are commonly used as brighteners. Other deleterious foreign materials are antimony, lead, silver, arsenic, tin, nitrates and decomposed organic matter. Some of the metallic impurities are removed by lengthy electrolytic purification at 1–2 amp/sq ft, but the most effective method is by displacement which removes most of these, using zinc dust as the adsorbent agent. Organic impurities are most effectively removed with activated carbon as the adsorbent medium. This involves warming the solution to about 120–140° F adding to it a slurry of 2 to 3 pounds of activated carbon per 100 gallons of cadmium solution, stirring for about one hour then the bath is allowed to stand from 4 to 6 hours then filtered, using a filter pack of filterbestos or equivalent. About 5 per cent of the solution at the bottom of the tank which contains most of the slime is discarded.

Although poorly plated cadmium is seldom a cause to worry, at times we have to strip for any one of the several reasons. Materials used for stripping cadmium deposits from its basis metal are as follows:

a. Ammonium nitrate—1 lb/gal is excellent for the purpose.

b. Concentrated hydrochloric acid containing about 0.2 oz/gal antimony oxide will strip cadmium from steel without attacking the basis metal.

c. Cadmium may also be stripped from steel by electrolysis using a solution of 12 oz/gal of sodium cyanide and 2 oz/gal caustic soda in a steel tank. The work is made the anode and the tank could be used as the cathode and a potential difference of 6 volts is satisfactory. This has the added advantage that if the parts are not rinsed and they are allowed to dry, will not rust until they are reprocessed.

Of course, the way to keep from having cadmium plate that needs to be stripped is to maintain the bath and the operating conditions as prescribed above. One of the components, sodium carbonate, which may cause trouble some time if it is higher than the prescribed high limit is formed by decomposition of cyanides and by the action of carbon dioxide from the air on caustic soda. A practical range of concentration limit is 6 to 12 oz/gal of sodium carbonate at the metal concentration range of 2.5 to 4.5 oz/gal. (The lower metal concentration should correspond to the higher carbonate concentration. Conversely, the higher metal concentration should correspond to the lower carbonate concentration.) An excessively high sodium carbonate concentration may lower the current density of the bath thus causing dark streaky deposits at normal operating conditions and cause polarization of the anodes with subsequent excessive oxygen evolution at the anode interface, poor anode corrosion and rough deposits.

To remove excessive carbonates from the bath, the following procedures are satisfactory.

a. In winter, the plating solution is transferred into an outdoor tank and allowed to stand there for about a day (at about 32° F). Then the clear solution above the sodium carbonate crystals is decanted or filtered back into the plating tank.

b. Carbonate can be suppressed in the same manner if dry ice is used to suppress the temperature to about 32° F. This is done by submerging in the plating solution containers of perchloroethylene, naphtha or other medium and immersing into this the dry ice slabs. Again the solution should be kept at the required temperature for at least one day. The solution is then filtered as above.

c. The carbonate could also be removed by the use of pure calcium sulfate, but this is not very desirable because filtration of the bulky $CaCO_3$ precipitate formed becomes difficult. Another method is the use of calcium carbide. This latter is recommended only if there is a very little caustic soda in the plating solution since one ounce of this material will form 0.8 ounce caustic soda.

Another deleterious element which should be kept out

of the cadmium bath is chloride in any of its forms. Chloride ions corrode the steel tanks as well as anodes made of insoluble material such as case hardened steel. Since their removal is quite difficult, their presence should be avoided.

The following cycle is a typical one as practiced by many shops for preparation and plating.

a. Degrease or preclean using solvent or alkali precleaning materials to remove all excess foreign matter.
b. Rinse thoroughly if alkali or emulsion precleaning is used, using both spray and/or overflowing water rinse.
c. Electroclean, or soak clean as required, using standard cleaning conditions, such as type of cleaner, concentration, temperature of the bath, time and current density required for electrocleaning and rinse thoroughly as for (b) above.
d. Pickle or etch to remove any oxides on the parts, using the required solution for the purpose as well as the conditions required, followed by thorough rinsing.
e. Dip in 3 to 4 oz/gal sodium cyanide solution containing about 0.5 to 1.0 oz/gal caustic soda, to neutralize any acids that are difficult to rinse.
f. Cadmium plate, using the standard solution (choose the time requirements as indicated in Table A). Maintain a temperature of about 80–85° F, whenever possible, for optimum plating conditions.
g. Rinse thoroughly in spray and/or overflowing rinse.
h. Bright dip if required. Rinse thoroughly and dry.

Although cadmium finish is very attractive, as it comes out of the bath, certain post treatment methods are used for particular purposes:

a. To impart a more attractive and uniform finish ¼ per cent nitric acid is used by thorough rinsing, or a 5 to 7 per cent hydrogen peroxide acidified with about ¼ per cent sulfuric acid.
b. To impart a protective as well as lustrous finish proprietary clear conversion coatings are used. These are chromate type carefully adjusted to impart a microcolloidal film which seals the finish and also forms an oxide or cadmium chromate which is not stained by handling or by severe atmospheric attack.*
c. To impart an iridescent or an olive green finish which can withstand the severest possible service indoor or out, and act as a superb base for paint or similar organic finish.†

A most important function in maintaining the good operating conditions is the control of the basic constituents namely cadmium metal, total sodium cyanide, caustic soda and sodium carbonate. One does not need a fabulous laboratory to achieve this purpose.

Without using ultra-modern methods of analysis but by maintaining a few instruments, the purpose is ideally achieved. The following method of analysis is one such simple method for shop control of cadmium plating baths:

*Examples: Ker-Chro-Mite No. 2; Iridite; Unichrome, etc.
†One such formulation is the Cronak Process and several other finishes such as the proprietaries Ker-Chro-Mite GC and Iridite No. 1, Unichrome and several others.

I. Metallic Cadmium Estimation, the Classic Ferrocyanide Method

a. Reagents required: Standard potassium ferrocyanide, 33 g/l; concentrated hydrochloric acid; Uranium Acetate, 5 per cent.
b. Procedure: Pipette 2 ml sample of plating solution into a 250 ml beaker, add to it, under hood, 5 to 7 ml concentrated hydrochloric acid and heat slowly with good ventilation almost to dryness. Add to it about 150 ml of water and heat to 180° F. Titrate the hot solution with the standard ferrocyanide solution using the 5 per cent uranium acetate as outside indicator, until one drop on the stirring rod placed on one drop of the indicator on a spot plate will turn brown. The number of ml used times 0.5 = the concentration in ounces per gallon of cadmium. (For control purposes.)

II. Total Sodium Cyanide Estimation

a. Reagents required: 0.0766 normal silver nitrate solution (1.3 g/l), 10 per cent potassium iodide solution, concentrated ammonium hydroxide.
b. Procedure: Measure 2 ml plating solution into a flask, add to it 50 ml water and 5 ml concentrated ammonium hydroxide. Add about 2 ml potassium iodide indicator and titrate the sample with the silver nitrate standard to the faint yellow turbidity which does not fade. The number of ml used times 0.5 = oz/gal of total sodium cyanide.

III. Caustic Soda Estimation

a. Reagents required: Sodium cyanide CP grade, 0.94 normal sulfuric acid solution, LaMotte Sulfo-orange indicator.
b. Procedure: Measure 5 cc plating solution into a 250 ml flask, add to it about 1 gram of sodium cyanide, about 10 ml water and about ½ ml indicator solution. Titrate the sample using the sulfuric acid standard, to the change of color from orange to yellow. The number of ml of standard used equals oz/gal caustic soda in the plating bath.

IV. Sodium Carbonate

a. Reagents required: 10 per cent barium chloride solution, 0.71 normal hydrochloric acid, Methyl orange indicator solution.
b. Procedure: Pipette exactly 5 ml of plating solution into a 250 ml flask. Add 80 ml distilled water and 15 ml barium chloride solution and heat to boiling. Allow the precipitate to settle for 30 minutes on a steam plate and then filter through No. 30 Whatman paper. Thoroughly wash the flask and residue on the paper with distilled water. Return paper and precipitate to the flask, add 100 ml hot distilled water and 3 drops of indicator, then shake to pulp the paper. Titrate with standard hydrochloric acid until the first permanent pink color is obtained. The

number of ml of standard hydrochloric acid required equals oz/gal sodium carbonate in the plating solution.

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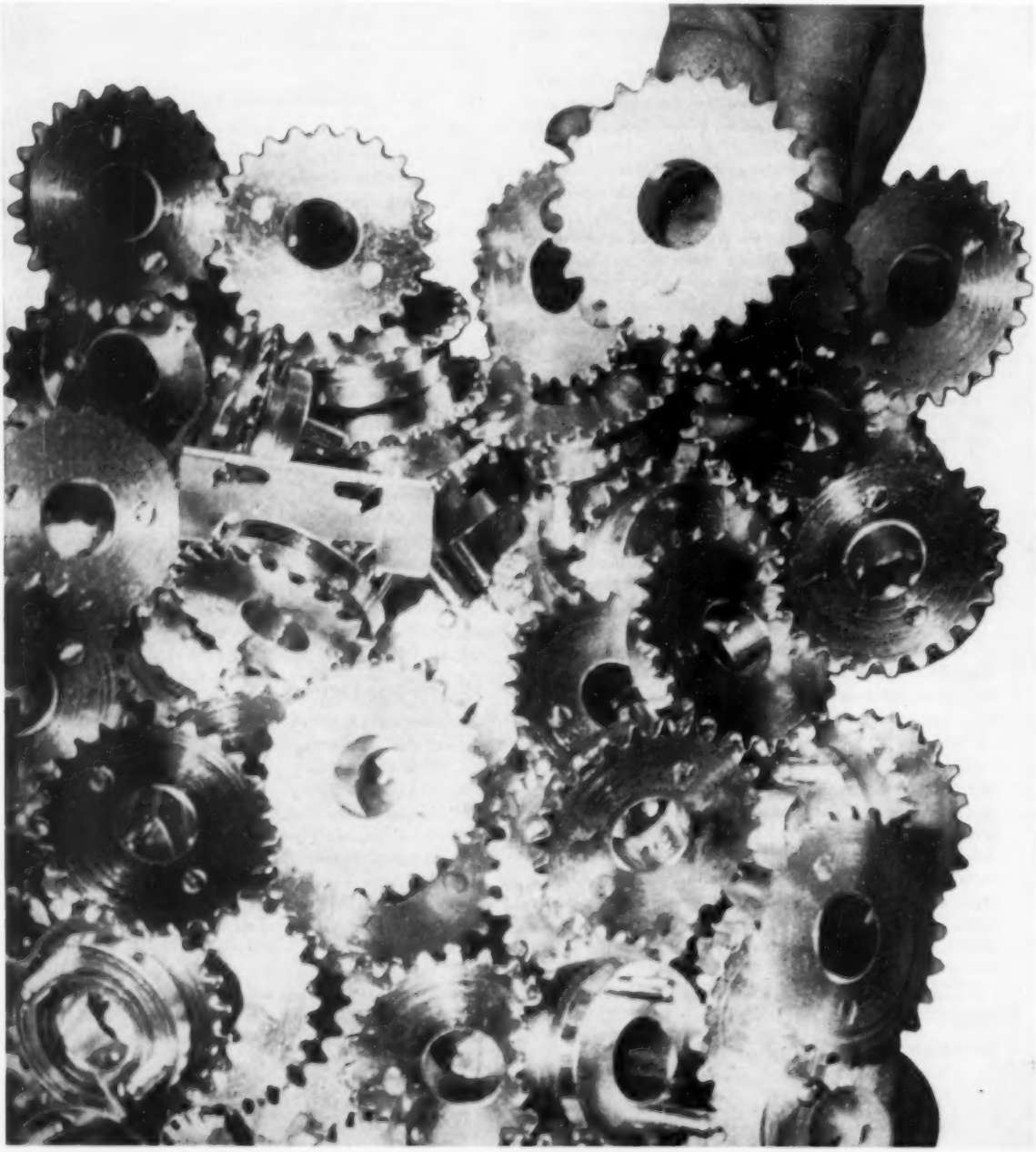
John Kosmos was born in New York City in 1911 and studied in the public schools and CCNY until 1941. After that, he continued his studies at the University of Connecticut and Trinity College. John kept right on studying throughout his adult life at technical trade schools, Hartford State Trade School (metallurgy and metallography). He is a member of the ACS, Electrochemical Society, MFT (London) and is most active in the AES.

He served on the educational committee of the Newark Branch in 1955 and conducted cadmium and zinc theoretical and practical classes in his establishment in conjunction with the AES Course in Electroplating sponsored by the Newark Branch.

Typical Cadmium Plated Parts. This photo appears on cover



Notes on Post-Treatment for HAE Coatings

by Harry Salmon and Fielding Ogburn*

The HAE process,† essentially an electrolytic process for forming a protective coating of magnesium oxide on magnesium alloys, normally consists of two steps: formation of a coating and a treatment for sealing. As with anodizing of aluminum, the sealing treatment reduces the porosity of the coating and improves its protective value.

Frankford Arsenal has studied several types of sealing treatments, and the best one developed at that laboratory is described in this paper. Investigations by the authors have led to alternative sealing treatments that are simpler and equally effective.

HAE Dichromate-bifluoride Post-treatment

The procedure developed and recommended by Frankford Arsenal for a dichromate-bifluoride post-treatment is as follows:

Following the electrolytic treatment, panels are rinsed, and then immersed for 45 to 60 seconds in an aqueous solution of sodium dichromate (2 per cent by weight) and ammonium acid fluoride (10 per cent by weight). The panels are allowed to dry in air without rinsing, after which they are placed in an oven over an open vessel of water and held at about 170° F for about 6 to 7 hours.

Frankford Arsenal also recommends that, after this treatment, the panels be allowed to remain under ambient atmospheric conditions for three days if they are to be subjected to salt spray tests.

The effectiveness of this post-treatment is illustrated by salt spray tests conducted at this laboratory. Panels (4 x 4 inch) of FS1 alloy coated by the HAE process and post-treated as described developed on the average two corrosion pits when exposed to salt spray for one week, whereas panels with HAE coatings that were not post-treated developed 20 corrosion pits.

Modified HAE Dichromate-bifluoride Post-treatment

Several modifications of this post-treatment were tested in an effort either to simplify or to improve it. One modification was the result of a series of experiments in which the effectiveness of simple humidity or hot water sealing was determined. HAE coated panels of FS1 alloy without benefit of any other post-treatment, were heated in an atmsosphere of 95 per cent to 98 per cent relative humidity at different temperatures for various lengths of time. Other HAE coated panels were immersed in tap water at various temperatures for various lengths of time. All the panels were subsequently subjected to the standard 20 per cent salt spray and a summary of these tests is given in Tables I, II, and III.

These data indicate that either the high humidity treatments or the hot water treatments were on the whole, beneficial. There is also some indication that the effectiveness of either treatment may increase with increasing time or temperature up to a point beyond which there appears to be no significant effect.

Table IV summarizes similar tests made to compare the effectiveness of sealing of an aqueous solution of sodium chromate (2 per cent by weight) with that of distilled water. The sodium chromate solution is as effective as distilled water and may be more effective for the shorter exposure to salt spray. Since a short immersion treatment is simple and quicker than heating for 7 hours over water in an oven, and since the presence of chromate in the immersion solution might be expected to minimize the leaching out of chromate from the dichromate-bifluoride treated coating, a chromate solution immersion treatment was tried as a substitute for the heating step in the recommended dichromate-bifluoride post-treatment. For this step the treated panels were immersed in an aqueous solution of sodium chromate (2 per cent by weight) at 77° C for 40 minutes. At the same time, tests were made to determine the effect of omitting each constituent of the dichromate-bifluoride dip. These tests are summarized in Table V.

The experimental results indicate that elimination of either constituent of the 60-second dip may decrease the effectiveness of the treatment. The simple immersion treatment C, followed the dichromate-bifluoride dip is

* National Bureau of Standards, Washington, D. C.

† "HAE Coatings for Magnesium," H. A. Evanglides, Product Finishing 54 (Oct., 1954).

just as effective as the prolonged oven treatment, D, of Frankford Arsenal.

Post-treatments in Solutions Containing Dibasic Ammonium Phosphate and Sodium Chromate

In testing other solutions for use as post-treatments for HAE coatings, it was found that panels treated in an aqueous solution of dibasic ammonium phosphate (4 per cent by weight) for 40 minutes at 77° C showed good corrosion resistance against salt spray for about a week, after which time the number of corrosion spots increased markedly.

When sodium chromate was substituted for part of the ammonium phosphate improved corrosion resistance was obtained, comparable to that obtained with the dichromate-bifluoride post-treatments. HAE coated panels were immersed in an aqueous solution of ammonium phosphate (2 per cent by weight) and sodium chromate (2 per cent by weight) for 10, 25, and 40 minutes at each of three temperatures: 40° C, 60° C, and 80° C. They were air-dried, without rinsing, and exposed to salt spray. The results in Table VI indicate that increasing the temperature of the immersion bath is definitely associated with better salt spray resistance. There seems to be some benefit derived from increasing the immersion time from 10 to 40 minutes, but the benefit is not pronounced. When dibasic sodium phosphate was substituted for the dibasic ammonium phosphate in this treatment, panels showed inferior corrosion resistance to salt spray.

Post-treatments in Solutions Containing (1) Ammonium Chromate, (2) Ammonium Dichromate (3) Ammonium Chromate and Dibasic Ammonium Phosphate, and (4) Ammonium Dichromate and Dibasic Ammonium Phosphate

A series of panels were post-treated by immersing them in solutions of ammonium chromate, (0.15 M) ammonium dichromate, (0.075 M) and in each of these solutions containing in addition, dibasic ammonium phosphate (0.15 M). Each post-treatment was applied by immersing the panels in the solution for 40 minutes at 77° C. All panels were air dried, without rinsing, and exposed to salt spray.

The post-treatments from solutions made with ammonium dichromate were not as good as those from solutions made with ammonium chromate. Under the conditions of treatment, this was true even though the chromium content of the solutions was the same.

Increasing the concentration of the phosphate and chromate in the immersion bath has no marked effect on the salt spray resistance. Moreover, the more concentrated solutions leave a salt deposit on the coating surface which might be objectionable under some circumstances.

Ethyl Silicate Post-treatment

Among many other treatments tried in the course of this work, those with ethyl silicate and hydrolyzed ethyl silicate solutions appeared to be effective for sealing the HAE coating. Good results were obtained by simply dipping coated panels in tetraethyl orthosilicate and air drying them, or by dipping them in hydrolyzed ethyl silicate.‡

‡ 50 volumes of ester are mixed with 30 volumes of 95 per cent ethyl alcohol and 1 volume of water. After standing for 24 hours, 9 volumes of water are added and the solution thoroughly mixed).

Each of these post-treatments reduced the number of corrosion spots to about 5 when 4 x 6 inch panels were exposed to salt spray for 21 days.

SUMMARY

Of the post-treatments for sealing HAE coatings described, two are of special interest:

1. Specimens are immersed in a solution of ammonium bifluoride (10 per cent by weight) and sodium dichromate (2 per cent by weight) for 60 seconds, air dried without rinsing, immersed in a solution of sodium chromate (2 per cent by weight) for 20 to 40 minutes at about 77° C, and air dried without rinsing.

2. Specimens are immersed in a solution of dibasic ammonium phosphate (2 per cent by weight) and sodium chromate (2 per cent by weight) for 25 to 40 minutes at 60° to 80° C, and air dried without rinsing.

Both of these post-treatments are as effective as the older one that requires immersion in the bifluoride-dichromate solution for 60 seconds, drying, and heating over water in an oven at 77° C for 7 hours. Also, they are simpler and more rapid, especially the one-step process (No. 2 above).

ACKNOWLEDGMENT

The authors thank Frankford Arsenal for support of this work and permission to publish this paper.

TABLE I

SALT SPRAY RESISTANCE OF HAE PANELS TREATED BY EXPOSURE IN HUMIDITY CABINET

(95 Per cent-98 Per Cent Relative Humidity)

	Average Number of Corrosion Spots in Salt Spray Test (Duplicate Panels)		
Treatment	2 Days	9 Days	16 Days
3 hr at 35° C	28	28	30
7 hr at 35° C	13	18	20
3 hr at 49° C	12	17	20
7 hr at 49° C	14	18	21
None	34	40	40

TABLE II

SALT SPRAY RESISTANCE OF HAE PANELS TREATED BY IMMERSING IN TAP WATER AT 77° C

	Average Number of Corrosion Spots in Salt Spray Test (Duplicate Panels)		
Time Immersed min	2 Days	9 Days	16 Days
0	25	28	29
5	18	23	24
10	14	19	24
20	13	18	20
40	18	20	25

TABLE III

SALT SPRAY RESISTANCE OF HAE PANELS TREATED BY IMMERSING IN TAP WATER at 50° C, 77° C AND 95° C

Time Immersed min	Temp ° C	Average Number of Corrosion Spots in Salt Spray Test (Duplicate Panels) 1 Day	5 Days	11 Days
None	—	24	33	33
40	50	24	29	29
40	77	18	20	21
60	77	17	21	21
40	95	17	21	21

TABLE IV

SALT SPRAY RESISTANCE OF HAE PANELS TREATED BY IMMERSING PANELS IN SOLUTION OF SODIUM CHROMATE TETRAHYDRATE (2 PER CENT BY WEIGHT) AND IN DISTILLED WATER AT 77° C

Time Immersed Min	Immersion Solution	Average Number of Corrosion Spots in Salt Spray Test (Duplicate Panels) 1 Day	5 Days	11 Days
40	Sodium chromate (2 per cent by weight)	1	11	11
40	Distilled water	6	11	11
—	No treatment	18	20	20

TABLE V

SALT SPRAY RESISTANCE OF HAE PANELS TREATED WITH MODIFIED HAE DICHROMATE-BIFLUORIDE POST-TREATMENTS

Each step in post-treatment was followed by air drying

Treatment	First Step 60 sec dip in aqueous solution	Second Step	Average number of Corrosion Spots Appearing on Duplicate Panels in 20 Per Cent Salt Spray Days in Salt Spray 2	7	11	21
A	ammonium bifluoride (10 per cent by weight)	a	0	5	8	8
B	sodium dichromate (2 per cent by weight)	a	1	8	10	11
C	sodium dichromate (2 per cent by weight), ammonium bifluoride (10 per cent by weight)	a	0	2	5	5
D	sodium dichromate (2 per cent by weight) ammonium bifluoride (10 per cent by weight)	b	0	2	4	5
No post-treatment			17	20	20	21

a—Immersed in an aqueous solution of sodium chromate (2 per cent by weight) at 77° C for 40 minutes.

b—Oven heated over water at 77° C for 7 hours.

TABLE VI

EFFECT OF TEMPERATURE AND TIME OF IMMERSION IN SOLUTION OF AMMONIUM PHOSPHATE-SODIUM

Chromate Sealing Treatment on Salt Spray Resistance of HAE Coatings

Time (Minutes)	Number of Corrosion Spots after 11 Days in Salt Spray (Duplicate Panels) Treatment Temperature ° C 40	60	80
10	9,11	5,7	4,5
25	11,12	4,7	1,2
40	7,8	3,4	3,4

Fielding Ogburn is Assistant Chief of the Electrodeposition Section of the National Bureau of Standards. B.S. in Chemistry in 1941 from the University of Chicago. Served in the Army in Italy in World War II. Joined Dr. Blum's group at NBS in 1946. Delegate and Past President of Baltimore-Washington Branch, AES. Director, AES Project 13, Chairman Washington-Baltimore Section of the Electrochemical Society. Chairman Subcommittee I of ASTM Committee B-8.

Harry I. Salmon, a native of Lock Haven, Pennsylvania, is a chemist in the Electrodeposition Section, Chemistry Division, National Bureau of Standards, Washington, D. C. After several years' experience in industrial laboratories in Pennsylvania, joined the staff of NBS in 1936, and since that time has been a member of the Organic Coatings and Electrodeposition Sections.

Figure 1. The roller gauge provides a convenient method of determining the thickness of the wet coat before baking. One of the advantages of plastisols is that coating mistakes can be easily remedied. If the resulting coat is too thin, dipping or spraying on more plastisol is relatively quick and easy

PLASTISOLS

TOUGH PROTECTIVE COATINGS FOR PLATING EQUIPMENT

By D. R. Meserve*

As a class of economical protective coatings for electroplating equipment, the plastisols are rapidly widening their range of applications.

In the plating room, the "plastic alloys" are now used successfully on racks, tanks, conveyor hooks, baskets, tool handles, anode hooks, plating barrels—even exhaust systems. Easily and quickly applied by spraying as well as dipping, plastisols provide seamless coatings of any desired thickness.

* Product Manager, Organic Coatings, Metal & Thermit Corp.

Besides providing chemical and electrical resistance, plastisols are being exploited for their toughness, elasticity, impact resistance, abrasion resistance, and sound-deadening properties.

Plastisols Are . . .?

Plastisols encompass an entire class of alkali and acid resistant, long-lasting vinyl plastic coatings. The term can refer either to a mixture containing the resin, pigment, plasticizer and stabilizer, or to the final plastic coat. Plastisols are usually marketed as liquid or paste mixtures.

By varying the components, plastisols can be made to serve a variety of needs. Chemical resistance can be altered by changing the ratio of resin to plasticizer, or by changing the type of plasticizer. The hardness also can be altered. Coatings as thick as 0.25 inch or as thin as 0.0025 inch can be obtained with just one application.

Heavy films are usually specified to insure protection from strongly corrosive plating baths. Thick plastisol coatings likewise insure against coating porosity and provide a resilient film to absorb impact without chipping or cracking.

Years of Service

One of the nation's largest automotive manufacturers estimates its two-year-old plastisol-coated plating racks have traveled over 18,000 miles in and out of plating solutions for copper, nickel and chromium. The tough, resilient coatings have been unaffected save for a slight tendency to harden.

Yearly changes in automotive designs require corresponding modifications in rack-design for new parts. Patching the modified portions of racks with plastisol enables last year's plastisol-coated racks to carry this year's products. Result: Savings in both time and materials.

Another automotive manufacturer has plastisol-coated plating tanks and screens in service for over three years. Plastisol is sprayed on the tanks, while the screens are hot-dipped.

Tackling a tough plating room problem, a large electroplater coated vent hoods and ducts with plastisols. After over three years of continuous service, the coated metal showed no signs of corrosion from the plating solution fumes.

Previously, Monel had been used for the hoods and ducts, lasting only a few years. Added savings are realized by using light-gauge standard carbon steel as a base for the plastisol.

This plater also coated—both inside and outside—a 24-inch diameter, 40-foot high stack, for venting acid fumes, with plastisol. After a year, there was no sign of acid deterioration or weathering—inside or out.

In a new installation, a large eastern aircraft manufacturer spray-coated plastisols on the inside and outside of plating and rinse tanks. The tanks range in size from 3 x 3 x 4 feet to 4 x 7 x 34 feet.

Smaller parts and equipment haven't been overlooked either: Electroplaters are applying plastisols on conveyor hooks and metal belts, baskets—even on diaphragms for separating the anode and cathode compartments.

Exposure Tests

Unichrome 5300 is an example of a spray plastisol currently marketed. In an exposure test over a period of 1½ years, parts coated with this compound were subjected to:

a. Both constant and intermittent immersion in zinc, brass, nickel, acid-copper, chromium and copper-cyanide plating solution at 160° F. The coatings were not affected by either the solutions or the solution fumes. Moreover, the coating did not affect the solutions.

b. Immersion in citric, lactic, benzoic, and oxalic acids, saturated and dilute solutions of alum, ammonium chloride, ammonium thiocyanate, barium sulfide, copper cyanide, di-sodium phosphate, nickel acetate, sodium dichromate,

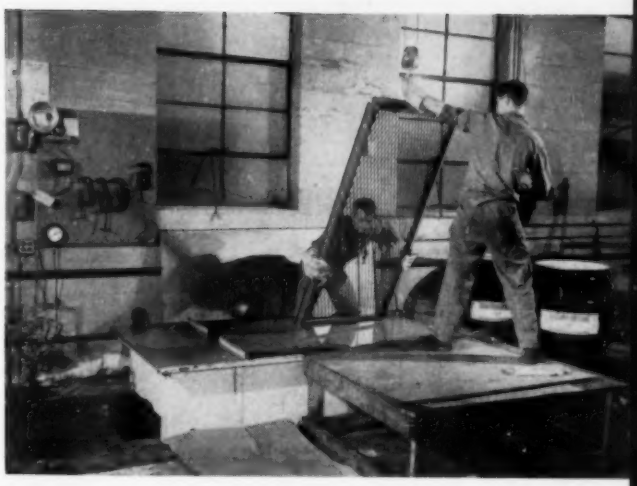
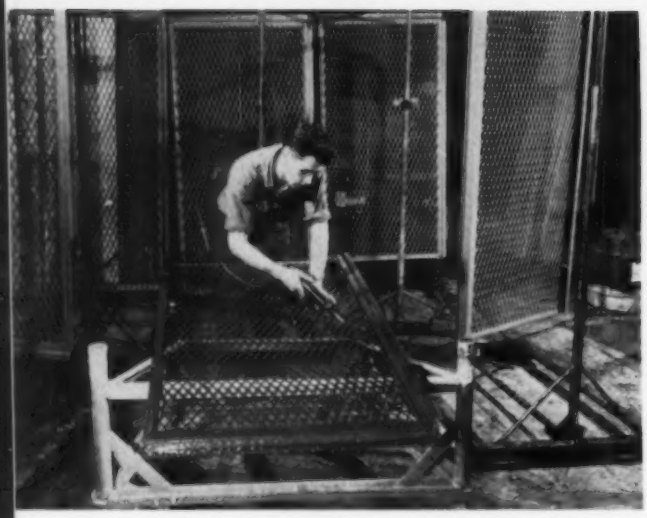


Figure 2.

Three Steps in Coating Screens:

a. Electroplaters get higher quality, longer lasting coats by dipping diaphragm screens (bag frames) in plastisol. These screens separate anolyte from catholyte.

b. After dipping, the screens are cured for about one hour at 360° F. Here, screens are being removed from oven after curing.



c. Spark testing provides a fast, convenient method of testing for pinholes and other metal. A portable voltage-generating hand tool is passed over the coated surface. If exposed metal is present, a spark will occur.

and zinc sulfate, all at 160° F. Again, the coatings were undamaged.

c. Both fumes and solutions at 120° F of—ammonium and sodium hydroxides, chromic acid, formaldehyde, hydrogen peroxide; and nitric, sulfuric, hydrochloric, phosphoric and sulfurous acids. The coatings were unaffected.

Constant immersion in carbon tetrachloride softened the coatings; in intermittent exposure, the plastisol films were undamaged. The coatings were also damaged by constant immersion in butyl acetate, benzine, amyl and ethyl alcohols, methyl and ethyl ketones, ethylene glycol, and gasoline.

Figure 3. A 3 x 6 x 6 foot tank is sprayed with plastisol to a thickness of 120 mils in this job shop

Plastisol Coating Processes

Currently two plastisol coating processes are being used to protect plating equipment. The dip process is usually used for small objects such as racks and baskets, the spray process for objects such as tanks that are too big to dip. In either process, a primer is baked on before applying the plastisol. Usually 15 to 20 minutes at 360° F suffices.

Two variations of the dip process are used—hot dip and cold dip. With the hot dip method, the object (still hot from baking on the primer) is dipped in a tank containing the plastisol. With the cold dip method, equipment is dipped at room temperature in the plastisol.

After dipping, the equipment is again baked for 15 to 20 minutes at about 360° F. Exact baking times and temperatures vary among applicators and vary with the parts being coated. Cooling in air completes the operation.

Hot dipping is preferable when thick coats are required. Thicknesses from $^1/_{16}$ inch to $^1/_4$ inch may be obtained. The thickness per coat is governed by the gauge and heat capacity of the metal. With the cold dip method, vertical withdrawal speeds of 17 to 18 inches per minute may be realized, making this method ideal for conveyorized dipping.

Physical characteristics of the objects may decide the method to employ. If the surface-to-weight ratio and specific heat are both high, the object may be unable to retain heat for a hot dip. Different plastisol formulations are required for hot and cold dip methods and for spray process. Each of the four basic constituents—the resin, stabilizer, pigment and plasticizer—must be combined in just the right amount and in the right manner for a specific application. (Among other things, the formulation depends on the process used and on the physical characteristics of the product to be coated.)

In the spray process, standard paint-spray guns are used to coat large objects such as tanks. Variations in such requirements as air pressure, caps and tips depend upon the formulation and can best be specified by the supplier of the particular plastisol used.

In the new electrostatic spray process, special equipment applies electrical potential to atomized plastisol and to the parts being coated. The plastisol is attracted to the part and cools it uniformly. Approximately twice as fast as dip-coating, this process affords further benefits in the appearance of the deposited film.

Is It O.K.?

Two methods are generally used to check the coating: spark testing and thickness testing.

If the surface of the object was not adequately cleaned prior to coating, pinholes can result in the coat. Or, if the applicator was careless in spraying, small areas may

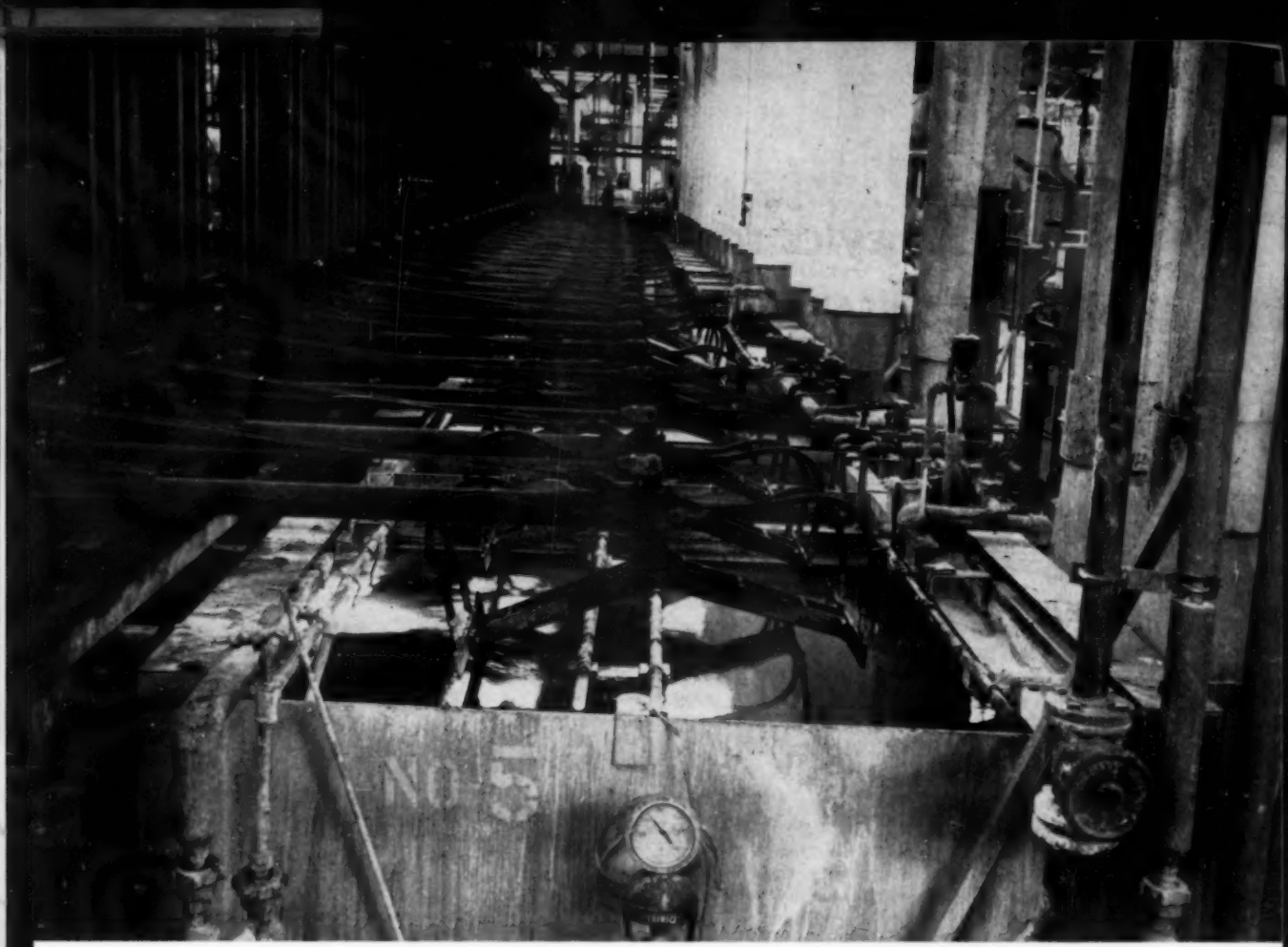


Figure 4. One of the nation's largest automotive manufacturers has used coated plastisols on plating tanks for over three years. The coats have been unaffected by corrosive plating acids. The tanks measure about 3 x 6 x 6 and 6 x 6 x 6 feet

remain uncoated. Spark testing provides a convenient method of inspection. A portable voltage-generator hand tool is passed over the coated surface. If there are pores in the coating which penetrate to the metal, a spark will occur.

The roller gauge provides a convenient method of determining the thickness of the *wet coat* before baking (interchemical wet film gauge). One of the advantages of plastisols is that coating mistakes can be remedied easily: If the resulting coat is too thin, more plastisol is applied simply by dipping or spraying. Other gauges are used for a check of the final dry film thickness as a further means of quality control.†

Comparative Costs

For plating tanks, plastisols coatings cost about half as much as sheet plastic or rubber coatings. And no joints or splices need be made.

For applications having numerous corners and bends, such as anode rod supports and ventilating systems, the applied cost differential becomes even greater.

Prices of the plastisol itself vary, depending on the service expected or required. Plastisol cost should always be balanced against the qualities desired for a proposed application.

D. R. Meserve was born in Johnstown, N. Y. in 1915. After graduation in 1939 from Middlebury College, Middlebury, Vt., where he majored in chemistry, Meserve began his business career as a development chemist with H. V. Walker Co., Elizabeth, N. J.

In 1942 he joined United Chromium, Inc., as an organic development chemist and was in charge of the company's organic coatings technical service from 1944 to 1950. From 1950 to 1955 he was sales manager of United Chromium's coatings division. When United Chromium was integrated with the parent company, Metal & Thermit Corporation, in May, 1955, he was appointed assistant sales manager of M & T's electroplating and coatings division; in June, 1956 he became product manager, organic coatings.

Meserve is a frequent speaker at branch and regional meetings of the AES. He is a member of the ACS, NACE and the AMA.

† General Electric Film Thickness Tester, Elcometer, Magma Gage are examples.

A DEVICE FOR TESTING THE WEAR RESISTANCE OF SURFACE COATINGS

by Jack McCarthy and James Morgia

PRESENT TESTING METHODS

The quick evaluation of the wear resistance of surface coatings requires an effective testing device.

At present, laboratory devices in common use for testing abrasion and erosion resistance of surface coatings are of two types. The first involves the action of an abrasive wheel against the coating and is operated under controlled conditions of pressure and speed using wheels of specified abrasive characteristics. The wear resistance is given in terms of number of cycles of rotation before break-through.

The second device involves the action of a stream of abrasive particles against the coating surface. The abrasive stream is directed on the spot to be tested under controlled conditions of abrasive particle size, flow rate, height of abrasive drop, etc. The abrasive stream may be motivated by a simple gravity drop, or may be blasted under controlled conditions of air pressure.

Both of these devices have disadvantages:

The abrasion wheel device is subject to (1) clogging of the surface of the abrasive wheels with abraded material and (2) smoothing of the wheels through wear. Both of these conditions alter test results.

The conventional abrasive flow device is subject to erratic flow of abrasive material, whether it employs a gravity flow or pressure blast. It is difficult to maintain uniform testing conditions with this device and results tend to be irregular.

Because of these disadvantages and because it was not felt that results were sufficiently reliable using these devices, an apparatus was constructed which permitted more reliable determination of relative wear resistance and at the same time gave more rapid results.

DESCRIPTION OF ROTOBRADER

The apparatus is based upon the "falling abrasive" method, but with two important alterations:

1. The sample is revolved at high speed through the path of the falling abrasive, permitting rapid test results.

2. Two samples are run simultaneously, one of which may be a standard, and the other, the sample to be tested. This method of exposing the two samples simultaneously to substantially identical conditions of wear permits a reliable comparison of the relative merits of the two coatings.

Components of the apparatus, which is called a Rotorbrader, are shown in Figure 1.

1. Is a steel can 22 inches in diameter and 22 inches high.

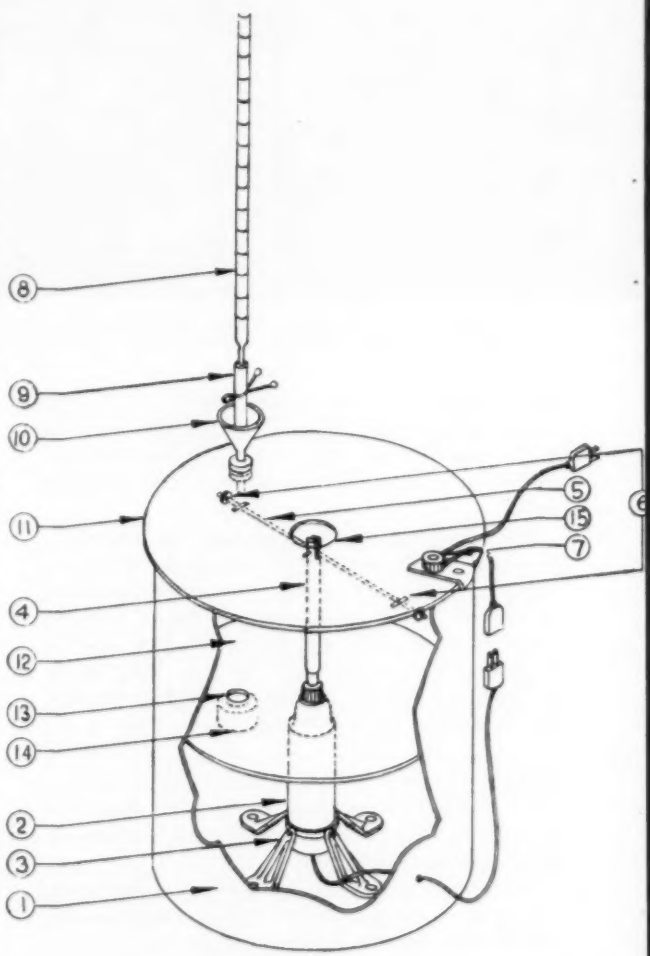


FIG. 1

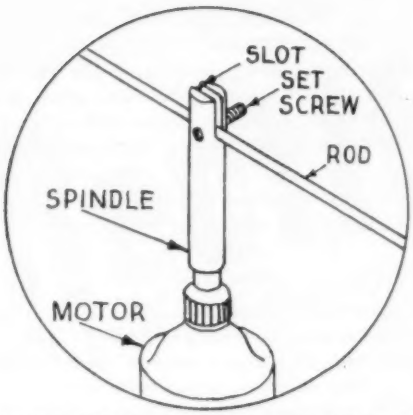


FIG.2-SPINDLE & ROD ATTACHMENT

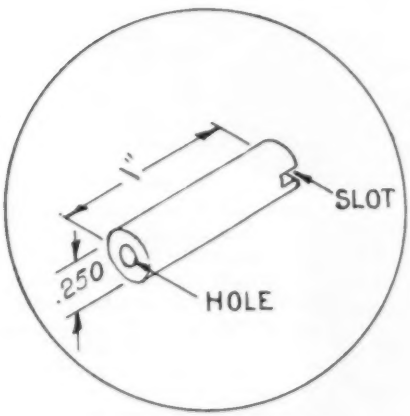


FIG.3-TEST PIECE

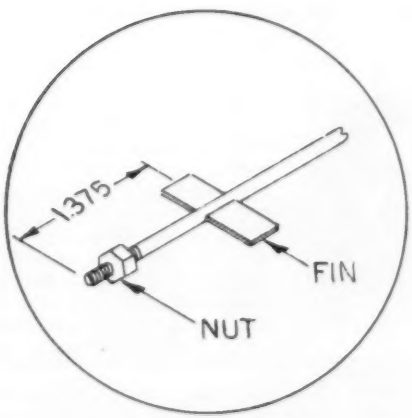


FIG.4-ROD END

2. Is a Talbot model 103 direct drive variable speed control stirrer motor rated at 1/12 hp and capable of speeds up to 12,000 rpm.

3. Is a support suitable for fastening the motor firmly to the bottom of the can.

4. Is a spindle, machined at the bottom to fit the chuck of the motor and slotted at the top to hold the sample support rod at right angles (see Figure 2). A set screw is tapped into the side of the spindle to permit firm clamping of the sample support rod in place.

5. Is a sample support rod made of a steel drill rod measuring 19 inches in length and $^{5}/_{64}$ inch in diameter. Various clamping devices may be used at the ends of the rod to hold the sample firmly. The design will depend upon the shape of the sample being tested. In testing the wear resistance of hard anodized coatings on aluminum, cylindrical rods measuring 6 inches by 0.250 inch were anodized under experimental conditions. The rod was then cut into 1 inch lengths and drilled and slotted as shown in Figure 3. The sample was mounted by slipping it over the end of the sample support rod prepared as shown in Figure 4. The sample support rod, as shown, has a welded fin which fits into the slot in the sample, preventing it from turning while under test. It also has a threaded end, and the sample is firmly fastened to the rod by means of the nut shown.

6. A test piece, as described above, is shown in Figure 3.

7. Is a variable speed control rheostat to permit variation of the speed of revolution from 0 to 12,000 rpm at no load. Maximum effective rpm depends upon the weight and dimensions of the spindle, support rod and the test piece. The rheostat is affixed to a Plexiglas plate which in turn is attached by means of a pivoting bolt-nut as a cover over a four-inch hole in the large Plexiglas cover sheet described in No. 11. This hole is large enough to insert one hand into the test chamber and change the test pieces without removing the entire cover assembly. Electrical connections outside the instrument must be disconnected whenever the cover plate is pivoted or removed. This is a safety feature to prevent entrance to the test chamber when the rotor is spinning.

8. Is a calibrated glass column containing No. 80 silicon carbide abrasive grit or other suitable abrasive. The column is 48 inches high and 12 mm in i.d. A one-inch column of the above grit normally weighs about six grams.

9. Is a rubber tube with pinchcock to control the flow of abrasive and is attached to a glass tube which has a constricted orifice with a 0.100 inch opening to give a continuous even flow. The above grit normally flows at the rate of about one inch in ten seconds through this system.

10. Is a glass funnel to impinge the flow of abrasive on the test piece.

11. Is a Plexiglas cover sheet over the entire test chamber. The cover contains a hole for a funnel which passes through a rubber stopper; a hole (15) above the spindle to permit the measuring of the rotational speed with an rpm counter; and a third hole under the rheostat, as described under (7). The cover has a rubber seal around its edge which provides a firm and tight fit to the test chamber.

Rotobrader

12. Is a Plexiglas floor to protect the motor from the whirling abrasive particles and permit a convenient method for collecting spent abrasive. It has two holes: one in the center through which the neck of the motor passes, and another (13) through which abrasive falls or is swept into the collecting container. A covered grease seal between the motor shaft and the floor prevents grit and dust from filtering through this juncture and damaging the motor

OPERATION OF ROTOBRADER

Wear tests may be run by either of two methods. By the first method, standard samples are prepared under controlled conditions to produce coatings of known wear properties. One of these samples is attached to one end of the test rod and the piece to be tested is placed at the other end. The pieces are then revolved swiftly through the stream of falling abrasive. Because the test conditions on the two pieces are essentially identical at speeds in excess of about 2,000 rpm, a direct comparison of the relative resistance of the two pieces is obtained. The parts are examined periodically to determine when the coating under test has worn through.

By the second method, pieces under test may be revolved at a standard speed and their wear resistance indicated in terms of the weight in grams or the column inches of standard grit required before break-through of the coating.

Time in seconds may also be used, since a substantially uniform weight of grit falls each second.

CONCLUSION

The Rotor-brader gives a severe wear test, and results are usually obtained in a matter of minutes, which is a great advantage when large numbers of samples are to be tested. A hard anodized coating 0.003 inch thick can be made to wear through in five minutes or less. If desired, the time to break through may be greatly extended by reducing the rate of revolution.

The device has proved useful in indicating the relative wear potentials of various anodic coatings and paint coatings under certain wear conditions encountered by aircraft in flight.

Jack McCarthy is a process engineer with Sikorsky Aircraft Division of United Aircraft Corporation, Bridgeport, Connecticut. He is concerned with process control and development in connection with metal finishing operations and corrosion mitigation procedures. He has been with Sikorsky Aircraft since 1952.

Previously he was employed as plating chemist with the Contract Plating Company, Stratford, Connecticut, in 1951 and 1952.

He received a BA degree from Yale University in 1944 and is a member of AES and the National Association of Corrosion Engineers.

James Morgia is a process engineer with Sikorsky Aircraft and is concerned with the process control of organic finishing operations and the testing and development of organic finishing materials and procedures. He has been with Sikorsky for the past year.

He was previously employed from 1951 to 1955 at Columbia Records Corporation at Bridgeport where he was concerned with plastic formulation and control and also as foreman of the record finishing department.

He received a BS degree in chemistry from the University of Connecticut in 1946, and an MS degree in chemistry from New York University in 1949. He is a member of the American Chemical Society.

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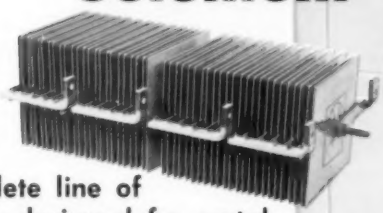
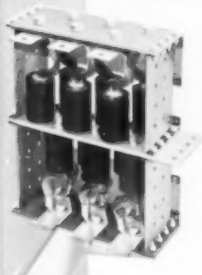


Selenium and Germanium



- a complete line of rectifiers designed for metal finishing operations
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Since H-VW-M manufactures *both* types of rectifiers—as well as low voltage generators . . . plus incorporating several choices of voltage controllers for electroplating, electroforming, anodizing and many other electrolytic applications—you can be sure an H-VW-M recommendation is the right recommendation.

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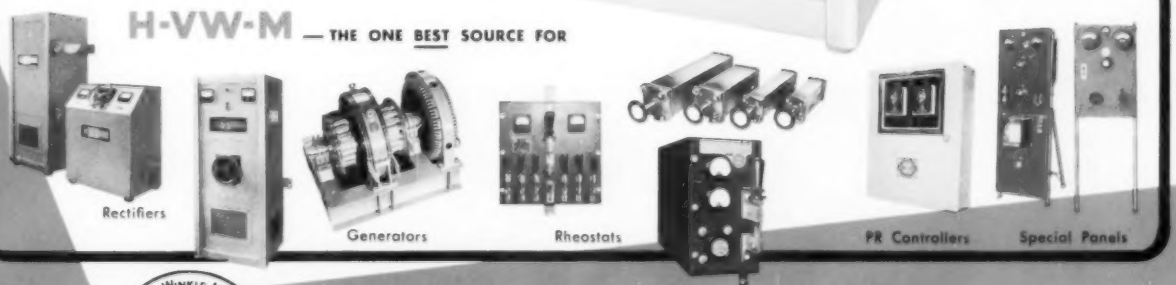

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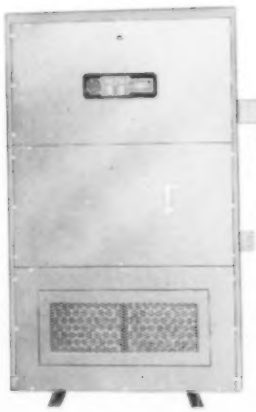
Selecting the right low voltage control equipment to give you proper control in your specific application is a major problem. But this problem is eliminated when you rely on H-VW-M. For H-VW-M produces the world's most complete line of low voltage direct current power equipment. That's why, when H-VW-M engineers make a recommendation you can be cer-

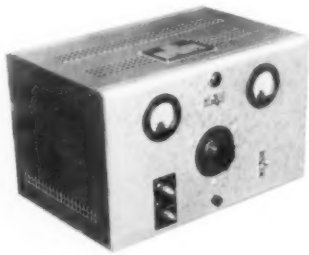
SELENIUM

Highest quality and efficiency, flexibility, economy and low maintenance are the characteristics combined in H-VW-M's full line of self-contained and remote control Selenium Rectifiers. Possessing a high power factor and low ripple, these standard and bench-type rectifiers provide a voltage range of 6 to 48 volts DC.

H-VW-M 2500 ampere, 9 volt self-contained rectifier with tap switch control.



H-VW-M remote controlled 5000 ampere, 9 volt rectifier with tap switch control.



H-VW-M small bench rectifier—50 amperes at 6 volts.

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Greater effective selenium plate area per ampere—Individual plates are made of an aluminum alloy, with a layer of highest quality domestic triple-purified selenium.

Electrically balanced selenium plates—Each plate precision-tested to insure *electrically identical plates* in the same stack.

Corrosion-protected stacks—A coating of fungus- and moisture-proof material renders selenium stacks impervious to the corrosive conditions of average plating rooms.

Oversize transformers—Designed for continuous duty at KVA ratings of about 50% greater than the DC output KW.

Adaptability—Auto-transformer can be used for both 220 and 440 volt input, and is protected with coating of moisture- and corrosion-proof material.

Transformer compensating taps for stack aging—Also compensate for small variations in input voltage.

Complete overcurrent and undervoltage protection—Magnetic starter with 110 volt control circuit provides extra safety. Precision-calibrated thermostats over stacks cut out starter when temperature of stacks due to overload rises above safe limits.

High cooling capacity—Large plate area per ampere, plus powerful forced air cooling system, permits continuous operation with minimum heat rise—lengthens life of selenium stacks.

Ask for Bulletin ER-107

RECTIFIERS-

high current rectification problem.

tain their recommendation is unbiased and in your best interest So when it comes time to select power equipment, call your nearest H-VW-M technical representative. He'll help you specify the right unit and type of control for maximum efficiency and economy in your plant.

GERMANIUM

Hanson-Van Winkle-Munning's new low voltage self-contained and remote control germanium rectifiers are specifically designed for the electroplating industry. The germanium junction, with its efficiency and economy of operation, compactness and vast improvement in voltage regulation, opens a new and wider field for metallic rectifiers in the plating industry.

Outstanding efficiency—At full load, with output voltages of 15 volts and above, the germanium rectifier is capable of efficiencies in excess of 90%. Even at lower voltages, efficiencies are exceptionally high.

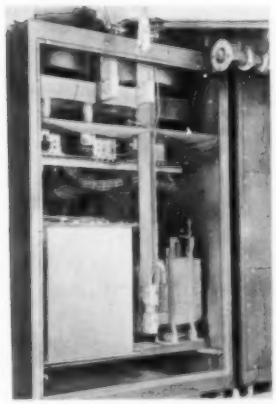
Improved voltage regulation—From no load to full load, voltage regulation of 8% or better can be maintained—no need for expensive automatic voltage stabilization devices in most cases.

Forced air cooling—Air is drawn up through the equipment, across junctions, out through the fan at the top.

Electrical protection—Overload and DC line shorts guarded against by inexpensive, replaceable link-type fuses. Overcurrent relay in DC circuit can provide additional protection when desired.

Designed for continuous 24-hour-a-day operation—At full capacity. Voltage range is from 6 to 48 volts, with current output from 1000 to 10,000 amps. Higher ratings are available for special applications.

Sturdy cabinet housing—All component parts located within housing. H-VW-M Germanium Rectifiers—though they require little maintenance—are easy to service.



Rear view, with panel open of a 3000 ampere, 15 volt germanium rectifier.

Remote control box with meters and start-stop and raise-lower buttons—for use with H-VW-M Rectifier incorporating motor-driven variable auto-transformer control.

Illustration of a compact germanium junction, the core of new unit.

Ask for Bulletin GR-100

SEE NEXT PAGE FOR CONTROL FLEXIBILITY AND SUGGESTED APPLICATIONS

CONTROLS *for both*

Selenium and Germanium RECTIFIERS

Selecting the proper control is of utmost importance for the most efficient, flexible and economical operation of your rectifier. H-VW-M offers the widest possible selection of controls and control combinations to meet every requirement. Some application suggestions are listed below. Ask for further recommendations from your H-VW-M representative—you can be confident that you'll get top performance from your electrical equipment.

Manual Tap Switch Control

For both self-contained and remote controlled units. Remote control type incorporates tapped auto-transformer in control cubicle. In self-contained units these are located in basic cubicle. Provides 22 positions of voltage adjustment from zero to rated voltage.

Motor Operated Tap Switch Control

For simple pushbutton control of output from remote location. Used in conjunction with tapped auto-transformer. A small remote control box can be mounted on side of tank or other convenient place. Meters, pilot light, raise-lower and start-stop pushbuttons also on small remote cubicle.

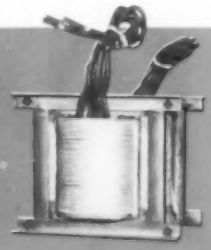
Continuously Variable Auto-Transformer

Either manual for small rectifiers or oil immersed, motor driven for larger ratings. This is the best method of voltage control since full stepless control of output voltage can be obtained from zero to rated voltage. It also achieves highest efficiency.

A raise-lower pushbutton as on motor operated tap switch control provides control.

Saturable Core Reactor

Wholly electrical in operation with no moving parts gives smooth voltage control from 10% to 100% of rated voltage providing minimum of 10% current load is drawn. Rheostat mounted on small remote control cubicle providing manual adjustment.



Automatic Voltage Stabilization

Where close regulation of DC voltage is desired to compensate for wide load changes in tank without adjusting voltage manually, a special device will automatically maintain voltage at pre-set amount. Either a voltage sensing panel in conjunction with a motor driven, oil immersed, continuously variable auto-transformer is used, or a special magnetic amplifier in connection with a saturable core reactor. Automatic constant current can also be provided.

Automatic Programming

Where different voltages are desired for special plating applications, an automatic programmer using a system of timers and controls will set the output at one voltage; operate at that voltage for pre-set time; change to another voltage at a pre-set rate; operate at new voltage for a certain time and then shut the rectifier off. There are also more simplified versions. Method of control is motor-operated continuously variable auto-transformer.

APPLICATION SUGGESTIONS

Use	Recommended Control
Batch Tank Plating	Manual tap switch.
Batch Tank Plating with wide load variations and high production	Motor operated variable auto-transformer, or motor operated tap switch.
Barrel Plating	Manual tap switch. No control rectifier.
Cleaning & Pickling	Manual tap switch. No control rectifier.
Conveyor—many stations	Manual tap switch (remote control). Motor operated tap switch. Saturable core reactor. Motor operated continuously variable auto-transformer.
Conveyor—few stations	Automatic voltage stabilization with variable auto-transformer. Automatic voltage stabilization with saturable core reactor.

Use	Recommended Control
Chrome Strike in combination with Plate Sulphuric Anodizing	Automatic programming with variable auto-transformer or special series hook-up. Manual tap switch. Motor operated tap switch. Saturable core reactor.
Color Anodizing	Automatic constant current with variable auto-transformer. Automatic constant current with magnetic amplifier and saturable core reactor.
Chromic Anodizing	Automatic programming with variable auto-transformer. Combination automatic constant current and automatic voltage stabilization with variable auto-transformer or saturable core reactor.
Electrolytic Metal Refining	Automatic current control with saturable core reactor.

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0–18
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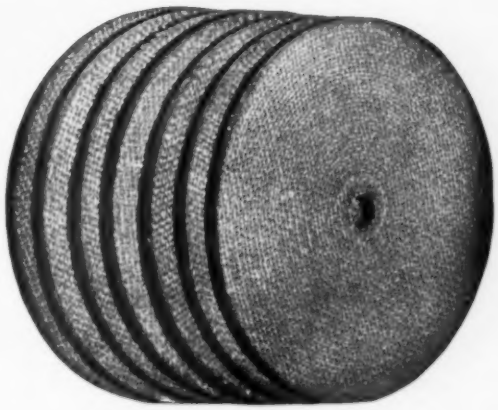

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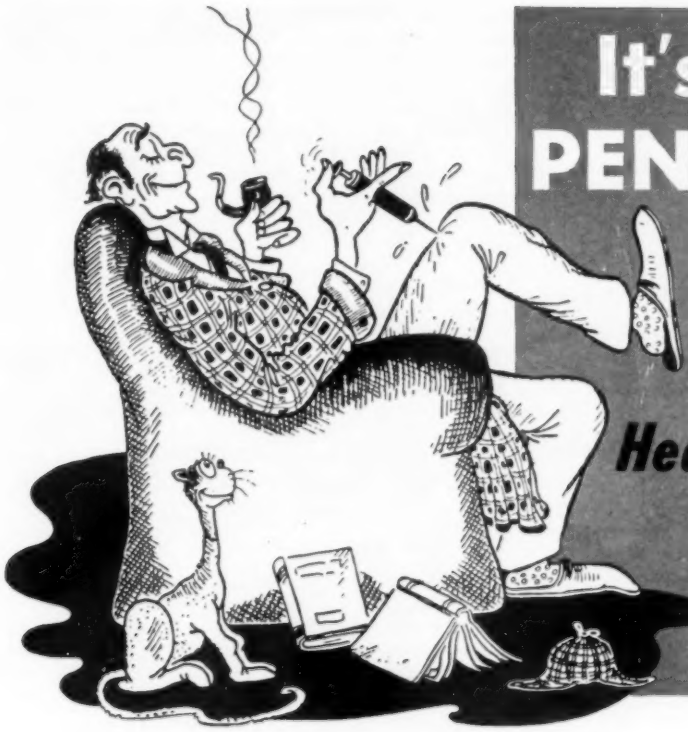

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This mild, low-pH soak cleaner is excellent for use on steel and most types of nonferrous metals, particularly to remove oily films with mineral oil base. Removes heavier oil films than most soak cleaners.

AHCOLOID CLEANER 202-B

Similar to 202-A but with higher alkalinity. Good to remove semi-solid, greasy, or waxy soils on steel and ferrous metals.

AHCOLOID CLEANER 213-B

This unique, low-pH soak cleaner is very mild . . . ideal on steel and stainless to remove drawing or stamping compounds and die lubricants with high metallic soap content . . . also drawing lubricants on phosphated surfaces.

AHCOLOID CLEANER 215

Economical soak cleaner for steel and nonferrous metals. Its low-foaming characteristic makes it ideal in tumbling equipment or for still tank processing. Many types of soil respond best to this cleaner.

Often cleaning problems arise from the unknown nature of the materials which cause the soil . . . why not submit your problem to our laboratory for testing and recommendations . . . without obligation.

22

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202-A ☐ 213-B ☐

202-B ☐ 215 ☐

Apothecaries Hall Co.

PATENT ABSTRACTS

DR. D. GARDNER FOULKE
Manager, Electrochemical Development
Hanson-Van Winkle-Munning Co
Matawan, New Jersey

Copies of patents may be obtained by writing to Commissioner of Patents, Washington, D. C. Price 25 cents each.

No. 2,743,221, April 24, 1956—Electrolyte Composition—Paul Sanford, Anaheim, Calif.

The electrolyte described is for the production of anodic coatings on aluminum. To the electro-anodizing bath (sulfuric mentioned in a number of claims) is added the acidic extract of low grade coal, lignite or peat. The extract is obtained by boiling at 350° F in water. Hard anodic coatings are claimed.

28 claims.

—AES—

No. 2,744,843, May 8, 1956—Enamel Bonding by Use of Arsenic—B. Craig, assignor to A. D. Smith Corp., Milwaukee, Wis.

This improvement in bonding vitreous enamel to steel consists of dipping the steel in an arsenic acid solution (less than 25 per cent by weight) to deposit a tightly adherent insoluble coating thereon, after which the enamel is applied.

4 claims.

—AES—

No. 2,744,859, May 8, 1956—Electroplating Method—R. Rines, Boston, Mass.

The method of electroplating involves passing a current below the electroplating potential then impinging an electron stream to certain areas of the cathode thereby controlling the plating to near said regions only. See also No. 2,744,860 by same patentee, 12 claims describing the use of sonic vibrations (directed) in electroplating.

5 claims.

—AES—

No. 2,745,797, May 15, 1956—Electroplating Pipe Joint—G. Long, assignor to General Motors Corp., Detroit, Mich.

The method of coating a joint between sections of copper and aluminum consists of immersion depositing cadmium on the aluminum adjacent said joint, then electroplating the immersion deposit and adjacent copper.

1 claim, figure.

—AES—

No. 2,745,798, May 15, 1956—Method of Coating Metal Surfaces—B. Haueisen and F. Wales, Detroit, Mich.

The exterior of aluminum pistons with internal ferrous strut supports are anodized by placing in a tubular porous shell with an absorbent liner (synthetic polymeric amide) in contact with piston. The liner is flooded with electrolyte during the anodizing operation.

5 claims, drawing.

No. 2,745,799, May 15, 1956—Process for Coating Aluminum—J. Patrie, assignor to Pechiney Compainge de Produits Chemiques et Electrometallurgiques, Paris, France.

This process for electroplating aluminum consist of laying down a zincate film (immersion preferably, or electrolytic). The film is then removed and another zincate film formed, after which plating by other metals (nickel specifically named) may be carried out. The zincate bath should contain copper, silver or cadmium cyanide. Example 1 gives:

NaOH	300 g/l
ZnO	75 g/l
CuCN	6 g/l
KCN	170 g/l

10 claims.

—AES—

No. 2,745,800, May 15, 1956—Electroplating with Iron—J. Poor, assignor to Van Der Horst Corp., Olean, New York.

Claim 1 describes the ferrous aqueous bath containing not more than 3 g/l of ferric iron and at least 26 g/l of an acid radical (Cl^- or $SO^{=}_4$ and Cl^-) in the amount of 6½–100 g/l along with 10–100 g/l of fluoborate radical. Temperature, to 160° F; pH, 2–5.

16 claims.

—AES—

No. 2,745,801, May 15, 1956—Chromium Plating—T. Blaine, assignor to Harshaw Chemical Co., Cleveland, Ohio.

To produce bright chromium deposits on Sb, Sn, Ag and Pb a chromium plating bath is described containing acetates in the amount of 15–35 per cent of the chromic acid. Example 2 gives:

Chromic acid	250 g/l
Acetic acid	50 g/l
Sulfuric acid	1.0 g/l

The conditions are 200 asf and room to 100° F.

5 claims.

—AES—

No. 2,746,136, May 22, 1956—Treatment of Aluminum Prior to Electroplating with Lead—H. Richaud, assignor to Pechiney Compagnie de Produits Chimiques et Electrometallurgiques, Paris, France.

The process calls for pickling to roughen the surface, immersion coat with nickel (disclosure gives nickel chloride, 400 g/l; HF, 200 cc/l and H_3BO_3, 40 g/l) after lead may be directly plated in regular acid lead bath.

7 claims.

—AEA—

No. 2,746,732, May 22, 1956—Oscillator attachment for Plating Tanks—L. Giullette, Attleboro, Mass.

An oscillator is described for plating tanks equipped with horizontal agitator bars.

8 claims, 2 figures.

—AES—

No. 2,746,848, May 22, 1956—Etching—R. Jones, assignor to Photo-Engravers Research, Inc., Savannah, Ga.

This process for etching photoengraving copper prevents excessive undercutting as the result of the presence of 0.4–10.0 g/l of thiourea in the ferric chloride etching solution.

10 claims.

—AES—

No. 2,746,849, May 22, 1956—Method of Imparting High Brilliancy to Articles Made of Aluminum—W. Helling, et al Grevenbroich, Germany.

Claim I states the method for imparting brilliance to aluminium alloys consist of maintaining the articles for a period of 5–30 seconds at a temperature of 50°–80°C in an aqueous solution containing per liter 1.6–2.7 gram-molecules of nitric acid, 1.8–3.5 gram-molecules of ammonium, 3.5–7 from 25 x 10^{-5} to 25 x 15^{-4} gram-molecules of lead nitrate.

9 claims.

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PATENT ABSTRACTS

No. 2,746,884, May 22, 1956—Method of Tin Plating and Activated Fatty Oil Composition Therefor—L. Rosenstein and N. Gorin, San Francisco, Calif.

The use of 1–20 per cent of a resinous substance (rosin, wood rosin, hydrogenated rosin and rosin esters) in the oil covering the hot dip tin pot is described.

18 claims.

—AES—

No. 2,746,915, May 22, 1956—Electrolytic Metal Treatment—W. Giesker and R. Britton, assignors to Autoyre Company, Inc., Oakville, Conn.

It is claimed that the corrosion resistance of chromium plated steel in presence of salt solution is improved by making cathodic in a solution of a hexavalent chromium compound at 3–4 asf for 1–2 minutes at 200°F. Claim 3 mentions a composition consisting of 50 g/l of sodium dichromate and claim 2 says the pH should be below 7.

5 claims.

—AES—

No. 2,746,917, May 22, 1956—Electrolytic Grinding Apparatus—G. Comstock, assignor to Norton Company, Worcester, Mass.

A machine is described for stock removal by means of a plurality of conductive parts on a rotating wheel operating through an electrolyte. Means required to provide at the locus of stock removal voltages and current characteristics best suitable for safe, efficient stock removal are described.

17 claims, 8 figures.

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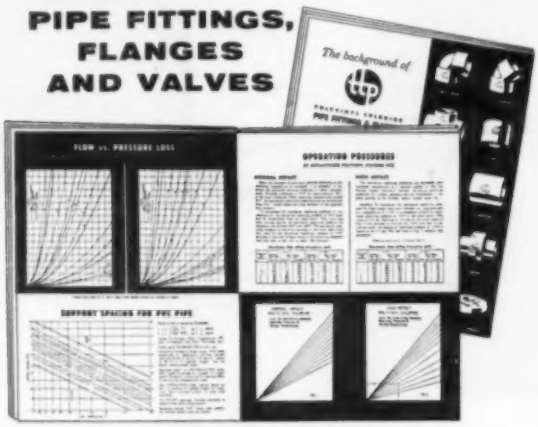

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ARTICLE REFERENCES

By
WILLIAM TUCKER
Eastman Kodak
Rochester, N. Y.

Most of the articles listed here may be obtained by writing to the Publication. Addresses are included for the reader's convenience.

Photostat or microfilm copies of articles in available magazines may be obtained from: Library of Congress, Washington, D. C.; New York Public Library, New York; Engineering Societies' Library, New York, at prevailing rates. In other cases, consult Wilson's Union List of Serials at your nearest public library for other sources of these articles.

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a. *EFFECT OF ALUMINUM SULFATE IN THE SULFURIC ACID ELECTROLYTE ON ANODIC POLARIZATION.*
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b. *CORROSION RESISTANCE OF PHOSPHATED STEEL AFTER HEATING.*
Jodie Doss.
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J. H. Molitor.
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I. Geld, M. Acampora, W. L. Miller.
Organic Finishing, August 1956, p. 14–15.

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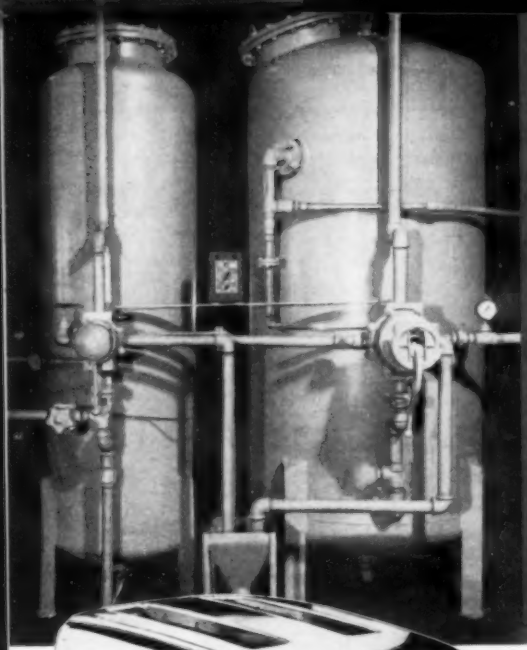

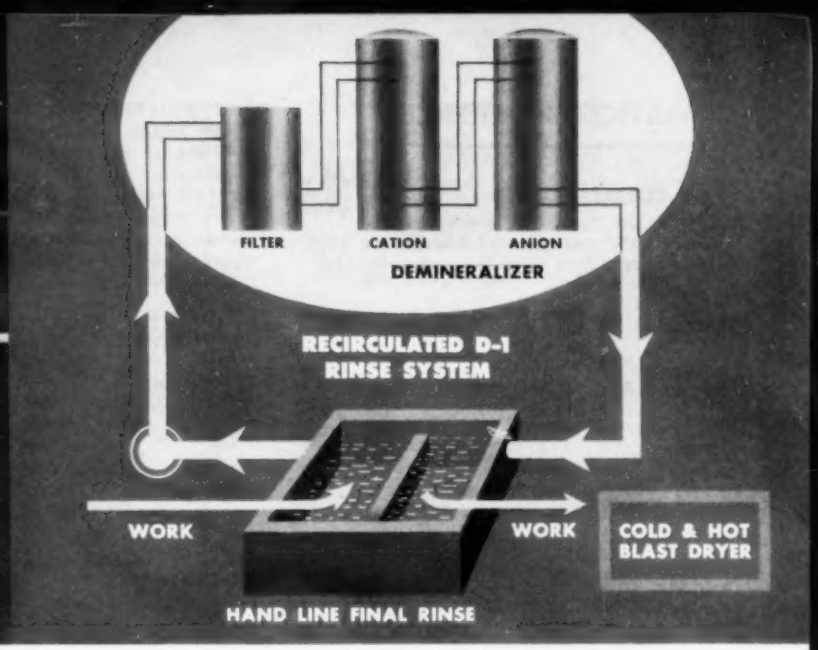

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Following are the addresses of the publications named in the Article Reference above.

Requests for articles should be made directly to the publication.

ASTM Bulletin
American Society for Testing Materials
1916 Race St.
Philadelphia 3, Pa.

Electroplating & Meta. Finishing
85 Udney Park Rd.
Teddington, Middlesex, England

Iron Age
Chilton Co., Inc.
100 East 42nd St.
New York 17, N. Y.

J. Electrochemical Society
216 W. 102nd St.
New York, N. Y.

Organic Finishing
Finishing Publications, Inc.
381 Broadway
Westwood, N. J.

Product Engineering
330 West 42nd St.
New York 36, N. Y.

Zhurnal Fizicheskoi Khimii
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INTERSOCIETY NEWS

SLA, METALS DIVISION, AT NATIONAL METAL CONGRESS

The theme of the program and booth of the Metals Division of Special Libraries Association at the National Metal Congress and Exposition in Cleveland, October 8–12, 1956 is Radiation Effects in Industry.

The Metals Division program will be held on Thursday, October 11, 1956. The morning session on Automation in Literature Research will consist of "A Report on the ASM Mechanized Literature Searching Project" by Allen Kent of Western Reserve University. The afternoon session on Publications on Industrial Uses of Atomic Energy will consist of: "The Literature of Industrial Power Uses of Atomic Energy" by Fred E. Croxton and Philip Leslie of Goodyear Atomic Corp.; "The Literature of Radiation Effects on Materials" by James B. Dodd of Babcock & Wilcox Co.; and a third paper on "The Literature of Radioactive Testing Techniques."

The booth at the Metals Show will feature current books and periodicals on the subject. Technical literature specialists will be on hand to answer questions.

Bibliographies on the following subjects will be available at the booth; Stainless Steel Wire; Thorium; Low Temperature Characteristics of Steels; and Welding of Stainless Steels.

Various field trips have been planned.

Dr. Lillian Gilbreth will be guest speaker at the dinner and social hour on Thursday evening at the Hotel Manger.

NICKEL SITUATION MAY IMPROVE

Plating and metal finishing job shop owners throughout the U.S. stand to receive additional nickel in the next few months, according to Mariano Ranno of New York, nickel committee chairman of the National Association of Metal Finishers.

Ranno, a partner in Imperial Plating Company, Brooklyn, indicated that following a series of hearings before the U.S. Senate Select Committee on Small Business, the long-awaited "green light" would be forthcoming soon from the Office of Defense Mobilization.

Ranno pointed out that there are two possible ways by which the nickel problem can be solved:

(1) Obtain and covert nickel ore sinter and nickel oxide from the U.S.-operated Nicaro nickel fields in Cuba.

(2) Obtain ODM authority to permit International Nickel Company *not* to remove job shop allocations should platers receive Nicaro nickel and, in this way, provide additional nickel to the job shop plating industry.

Hopeful of obtaining additional nickel in the near future, Ranno stated that the Dept. of Commerce will submit a final report on December 15, giving the nickel picture to Congress and urging a positive, corrective course of action.

The NAMF, an organization of plating and metal finishing job shop owners, has expended thousands of dollars and an equal number of man hours in behalf of nickel users in the industry, according to Ranno.

"We need the continued support of member and non-member job shops alike, if we are to obtain not only the necessary nickel allocation, but the proper recognition and representation in government circles as small business men in a very vital field of commercial endeavor," concluded Ranno.

ASEE SCHEDULES SECOND SCHOOL

In response to demands for nuclear training far beyond the capacity of the origina summer school for engineering, college faculty members at Argonne National Laboratory, a second school has now been scheduled. The supplementary institute will be conducted at Brookhaven National Laboratory, Upton, Long Island, New York.

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A Timely Message on

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by Ben P. Sax

President, American Buff Company

From seven-league boots to the seven wonders of the world, the number "seven" has held an important place in *fiction*, in cold hard *fact*, and in great human and scientific *feats*. Today I'd like to talk to you about

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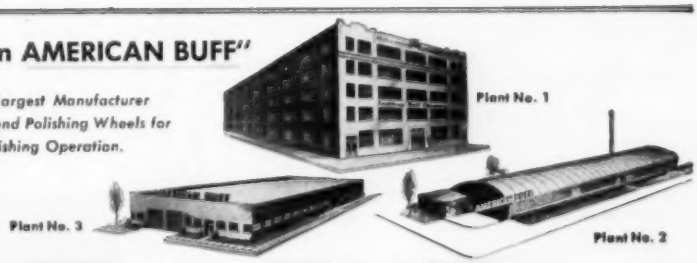

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INTERSOCIETY NEWS

Sponsored jointly by the Atomic Energy Commission, the National Science Foundation, and the American Society for Engineering Education, the Brookhaven program will accommodate thirty additional candidates. They have been chosen from twenty-two institutions in fifteen states as far west as North Dakota and as far south as Georgia.

The first Argonne school had a capacity of sixty, and more than 160 qualified applications and nominations were received from thirty-seven institutions in 28 states. For each candidate, recommendations were made by the deans concerned, with detailed plans for direct instructional use of the training to be gained.

Basic aim of both schools is to expand the number and scope of engineering course offerings in atomic and nuclear fields. This effort will, in turn, make available more engineering graduates who have some understanding of current developments in atomic energy and technology.

At both Argonne and Brookhaven, teaching services and facilities are being provided by the Atomic Energy Commission and the laboratories concerned. Partial travel and minimum matching funds for stipends from the candidates' colleges are being supplied by the National Science Foundation.

ASEE gives overall supervision and makes final selections of candidates. Local administration is provided at Argonne by Northwestern University and at Brookhaven by Associated Universities, Inc.

ASM Honors Seven

Seven distinguished leaders in the metals field will be honored by the American Society for Metals with awards which recognize contributions resulting in a great metal progress over the years. The awards will be presented during the 38th National Metal Exposition and Congress on October 8 through 12.

Edgar H. Dix, Jr., assistant director of research at the Aluminum Co. of America's Aluminum Research Laboratories at Pittsburgh, Pa., presented the coveted Albert Sauveur Achievement Award for his outstanding work in aluminum alloys research. The award, established by the ASM in 1934, is named for Dr. Albert Sauveur, late Harvard University professor and pioneer metallurgist.

William H. Eisenman, for more than 39 years national secretary of the American Society for Metals, headquarters Cleveland, Ohio, was chosen by Society trustees for the ASM Gold Medal. The trustees described Eisenman as a man who "advanced metallurgy from an art to a science" while helping build the society to its present membership of over 27,000 members in 100 chapters around the world.

Charles M. White, recently elevated from the presidency to the board chairmanship of Republic Steel Corp., will be given the ASM's Research Medal for his consistent sponsorship of metallurgical research and development. Under White's leadership, Republic Steel in recent years has been in the forefront of stainless steels and titanium research.

Three scientists share the ASM's Henry Marion Howe Medal Award, named for the late Columbia University professor who led in establishing the science of metallography (microphotography of metals).

The three to be honored as Howe Medalists are Dr. Alexander R. Troiano, professor and head of the Department of Metallurgy at Case Institute of Technology, Cleveland; Dr. William J. Barnett, former Case research associate now with General Electric Co. at Evendale, Ohio; and Dr. Richard P. Frohmberg, also a former Case research associate now a senior engineer with North American Aviation Corp., Downey, Calif.

The trio jointly authored a brilliant technical paper on "Delayed Failure and Hydrogen Embrittlement in Steel," published in Transactions, an ASM technical journal reporting on Metal Congress papers.

Dr. Ernest P. Nippes, professor of metallurgy at Rensselaer Polytechnic Institute, Troy, New York, will be given the ASM's Teaching Award for his outstanding performance in the teaching of technical men.

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STEVENS *Slants* ON METAL FINISHING

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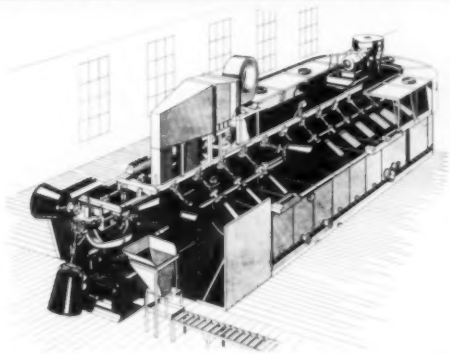

STEVENS AUTOMATIC BARREL MACHINES

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The list of owners of Stevens Automatic Barrel Machines reads like a page from "Who's Who" in American industry. Motorola, Chrysler, Westinghouse, General Motors, Ford, Illinois Tool Works, Maytag, I.B.M., National Cash Register and General Electric are but a few of the big companies aware of the economic and production advantages of Stevens Automatic Barrel Machines. Countless successful job shop operators are also big boosters.

The Stevens Automatic Barrel Machine provides for the complete metal finishing job in *one* machine. Where exceptionally high production is required, several machines can be used.

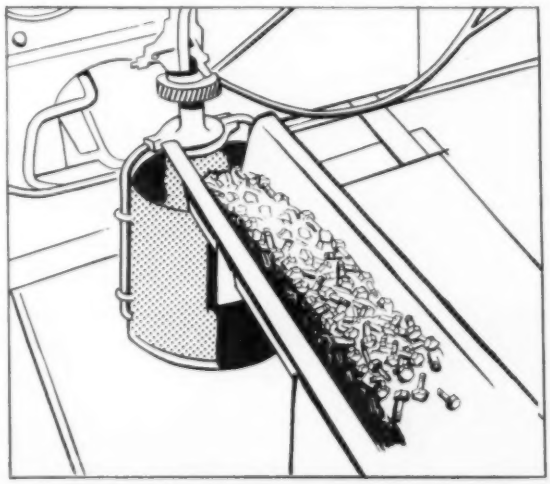
The Drying Unit Is Built In. No separate drying facilities are needed. The machine provides for a complete processing cycle of cleaning, acid, strike plating, rinses, bright dip as well as automatic drying and unloading.

The Machine Is Versatile. Plating time can easily be changed by simple adjustment of a control panel timer. Barrels can be adjusted to dwell or miss certain tanks in the cycle so that different types of work can be accomplished. And when necessary, the complete cycle can be changed by easy modification of the existing machine thereby eliminating costly new capital expenditures.

Dragout Is Reduced. The simple clean construction lines of the Stevens cylindrical barrel reduces carry out of solution far below that resulting from octagonal and older style cylinders featuring panel ribbed construction.

Parts Do Not Become Mixed. Since all parts remain in the plating barrel during the complete processing cycle, mixing of parts is entirely eliminated. Smaller capacity barrels make possible the processing of small emergency loads without the inconvenience of partitioned barrels and without penalizing production.

Machine Is Easily Installed. Most Stevens machines are shipped as one unit, mounted on skids for movement into your plant. Erection time and costs are greatly reduced. Furthermore, all machines are of a size that do not require inside factory alterations. When connections for electricity, steam, water, air, and ventilation are made the machine is ready to go.



Completely Automatic loading and unloading is possible with all Stevens Automatic Barrel Plating and Processing Machines. These are the only barrel machines on the market with this important feature.

STEVENS *Slants* ON METAL FINISHING

NO MATTER WHAT YOUR PLATING OR PROCESSING REQUIREMENTS ARE, THERE IS A STEVENS MACHINE TO DO THE JOB

Stevens Automatic Barrel Machines are now in use for copper, tin, cadmium, zinc and nickel plating. They are also used for cleaning, washing, phosphating, stripping, alroking, lubriting, and other types of immersion processing.

There are many operational advantages to be enjoyed in the use of Stevens Automatic Barrel Machines. Listed below are but a few.

MINIMUM LABOR REQUIRED — In most cases, one unskilled employee can operate the machine.

HANDLES THE COMPLETE CYCLE — Including cleaning, pickling, chromate treatments, plating, bright dip and is the only automatic barrel plating machine which includes drying.

COMPLETELY AUTOMATIC — No barrel lids to fasten and unfasten during automatic loading and unloading.

BETTER HANDLING — No mixing of parts. Becomes a part of a straight line production system. No partitioned barrels necessary for small loads.

NO HEALTH HAZARD — Occupational health hazards eliminated with ventilation of equipment.

UNIFORMITY OF PLATE — Accurate plating cycles timed to meet your requirements.

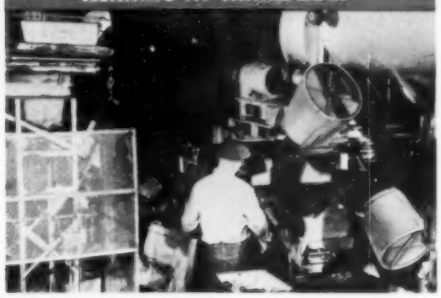
FITS ANY PLANT LOCATION — Does not need special buildings — can be moved at any time. Low head room.

DEPENDABLE — Scores of machines in use. Machine design and construction constantly improved.

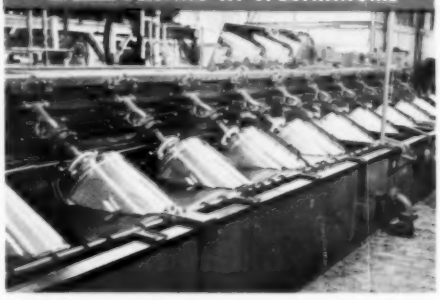
LOW INITIAL COSTS — For average operation lowest initial machine costs.

LOW MAINTENANCE COSTS — Proven over years of use and in varied operations.

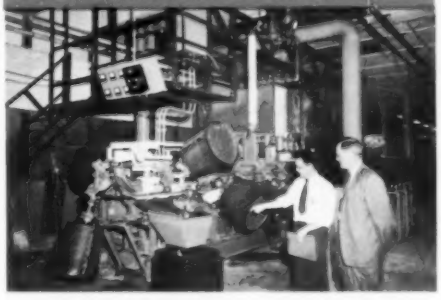
CLEANING AT SHAKEPROOF



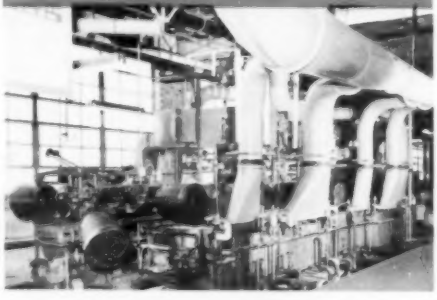
NICKEL PLATING AT SPECTRANOME



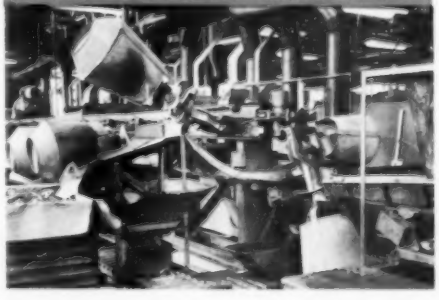
ZINC PLATING AT UNISTRUT



COPPER PLATING AT MOTOROLA



PHOSPHATING AT CHRYSLER



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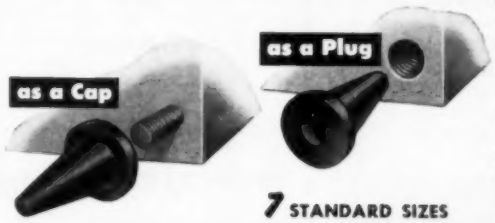

7 STANDARD SIZES

	A	B	C	D	E	F	G
TO PLUG HOLE SIZE	1/8-3/16	3/16-1/4	1/4-5/16	5/16-1/2	1/2-5/8	9/16-11/16	5/8-3/4
TO CAP STUD SIZE	3/32-5/32	5/32-3/16	3/16-1/4	1/4-5/16	5/16-3/8	3/8-7/16	5/16-1/2

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1500 TO 3000
1250 TO 2500
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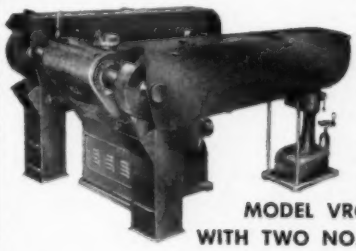
MODEL VROL VARIABLE SPEED

Turn the conveniently located dial and get spindle speed changes from 1500 to 3000 RPM instantly, while lathe is in operation. Model VROL Variable Speed, Ball Bearing, Polishing and Buffing Lathe with a spindle overhang of 8" permits handling of bulky parts without base interference.



Model VRO Variable Speed Polishing Lathe converted into a high production Abrasive Belt Unit by means of two Model 3-R Backstands. Faster, cooler cutting, increased production, more uniform finish are obtained through the use of abrasive belts.

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Two-spindle, two-motor, ball bearing model with motors in base, multi-V-belt drive and 8" spindle overhang. Choice of 3, 5 or 7½ HP motors and independent spindle speeds. Other models up to 25 HP.

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Chrome-like brilliance and corrosion protection at less than 1/5th of one cent per square foot. Long-lasting, easily controlled application.

BRASS & COPPER

Cobra C — for long-lasting protection by a simple dip.

ZINC & CADMIUM

Khaki-drab protective finish giving a colored finish with excellent corrosion protection.

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One quick dip gives a uniform, low cost finish ideal as a base for later painting.

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FOR ZINC OR CADMIUM

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25 YEARS AGO

The October 1931 issue of MONTHLY REVIEW concerned itself largely with platers' classes. The Editorial by Albert Hirsch, who was Chairman of the Bureau of Education, gave a summary of the philosophy of education. He pointed out that during the preceding year, 13 of the 27 Branches had classes. He included a summary of attendance of the Baltimore-Washington Branch classes. This report is most surprising when 60 per cent of the enrollees attended 75 per cent of the classes. Finally, Hirsch called attention to the fact that lesson sheets were being prepared for the analysis of nickel, cyanide copper, chromic acid and gold solutions. In the same issue, there is a round-table discussion on platers' classes. Here, indeed, is a spirit of dedication to education which has perhaps never been recaptured and has certainly never been achieved by any other Society. It is notable that the Bureau of Education cut across regional and branch lines to give platers' classes a universal flavor and the advantage of nation-wide planning.

The issue includes an article by R. J. O'Connor, which had been read at the Rochester Convention, and deals with barrel rolling and plating; another article by T. R. Hughes on "The Foreman is More Than a Boss." The last page of this issue includes two poems and two jokes.

10 YEARS AGO

The October 1946 issue of MONTHLY REVIEW carried a list of available Branch Speakers, an article on "Magnetism and Magnetic Thickness Gage" by B. G. Bowman, a biography entitled "George Westinghouse," an article by F. C. Mesle on "Silver Plating Bearings" and a long Research Report on Project 2 by Dr. Serfass and W. S. Levine. Again there was no Editorial. The magazine did have 45 pages of advertising. On page 1046 is a full-page ad announcing the 33rd Annual Proceedings which should be available soon. The cost was to be $6.50 per copy. The issue was, in general, an ordinary one, showing little of the bigger and penetrating excellence of its predecessors and, in fact, many of those which followed it.

how to substitute aluminum *for copper in electrical manufacturing*

Due to the high cost of copper, repeated attempts have been made to substitute aluminum for this costly metal for electrical purposes. While it is true that more aluminum than copper is required to transmit a given electrical impulse —the lower cost of aluminum makes the substitution very attractive from a cost standpoint. Unfortunately, on all previous attempts to use aluminum for electrical conductivity the aluminum corroded, causing poor contacts and subsequent failure of the mechanisms involved.

And that's where KENVERT 40 comes in—*a chrome sealer especially designed to prevent the oxidation of aluminum* by sealing it with a film having a very low microhm resistance.

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AES NEWS

COMMITTEE APPOINTMENTS

Dr. Samuel Heiman, AES President, made the following Committee appointments on August 18, 1956:

I. Liaison With Other Societies (Inter-Society Representatives)

1. Metal Finishing Suppliers' Association
   Mr. Earle W. Couch
2. American Society for Testing Materials (ASTM) Committee B-8, Electrodeposited Metallic Coatings
   Mr. Raymond F. Ledford
3. American Society for Testing Materials (ASTM) Committee A-5, Corrosion of Iron and Steel
   Mr. August Mendizza
4. American Standards Association, Committee Z-9, Sectional Committee on Safety Code for Exhaust Systems
   Mr. Myron B. Diggin, Chairman
   Mr. W. R. Fidelius

SOCIETY COMMITTEE

II. Publication Committee
Dr. Ralph A. Schaefer, Chairman
Dr. Earl J. Serfass
Dr. D. Gardner Foulke
Dr. Harold J. Wiesner

A considerate communication from Mr. R. Derby who wrote for Mrs. Sinclair informs the members of the AES that Mr. R. H. Sinclair passed away on May 28, 1956. Mr. Sinclair was a member-at-large since 1947. He lived in Leicester, England.

Mr. and Mrs. Les Reynolds posed for the Plating photographer at the 43rd AES Convention in Washington. (This picture was run in the August issue improperly captioned.—Ed.)

EDUCATIONAL SESSION

Papers for the Philadelphia Branch AES Annual Educational Session at The Benjamin Franklin Hotel, Saturday, October 20 will feature: "Mechanism of Corrosion of Plated Coatings" by Dr. Harold J. Read, Professor of Physical Metallurgy, Pennsylvania State University; "Double Layer Nickel Coatings—Corrosion Behavior and Protective Value" by Clarence H. Sample, Development and Research Division, International Nickel Co.; and a paper on supplemental treatments of nickel-chromium coatings to improve protective value.

The Educational Session under the direction of Dr. A. Kenneth Graham, president of Graham, Crowley & Associates and former AES executive secretary, will start at 2:00 PM. The banquet, followed by a show and dance, will get under way at 7:00 PM. Tickets are $7.50 a person and may be obtained in advance from Ticket Chairman Robert L. Farren, Jr., Aetna Electroplating Co., 7770 Dungan Rd., Philadelphia 11, Pa.

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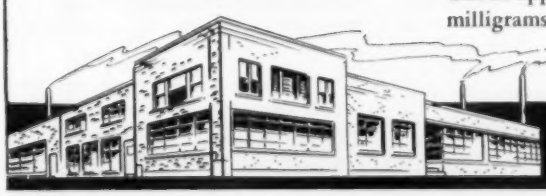
For electrical and other applications: protection from corrosion in air or unusual conditions . . . Particularly recommended for printed circuits and contact surfaces . . .

Can be applied to many surfaces from less than one to one hundred milligrams per square inch . . .



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BRANCH NEWS

ATLANTA

Joe Jackson on Control

The Southeastern Branch opened its 1956–57 season on September 14, 1956, at the Belmont Steak House in Atlanta, Georgia. Three new members were announced as **I. G. Florman** of Southern Fabricating Company in Sheffield, Alabama; **Warren W. Lee** of Wyandotte in Decatur, Georgia; and **Fred E. Fletcher** of Atlantic Chemical Company in Atlanta, Georgia. Plans were discussed for our 2nd Annual Technical Session scheduled for next February. **Joseph L. Jackson,** Head of Research and Development of the R. O. Hull Company presented a very informative illustrated lecture on "Recent Developments of Practical Electroplating Control."

Robert H. Probert
Secretary & Treasurer

BUFFALO

E. C. Bertuccio Helps Open Season

The Buffalo Branch held its opening meeting of the 1956–1957 season at the Markeen Hotel on September seventh. The meeting was preceded by a dinner.

The meeting was called to order by President **Ralph Mead.** A motion was made and approved unanimously that the November meeting be held in Jamestown, New York.

Librarian **R. Bleckenger** introduced the speaker, **E. C. Bertuccio** of Mutual Chemical Company who talked on "Ion Exchange and Chromium Waste Control."

After a discussion period the meeting was adjourned at 10:30 P.M.

Fred D. Goeckel
Secretary

CHICAGO

Two Summer Meetings; Hazucha Completes a Record

The July meeting of the Chicago branch was held on July 13. This meeting was well attended considering that the summer sessions are non-technical business meetings.

Considerable time was spent discussing ways and means of increasing attendance to the regular meetings. It was the feeling of the group that more operating men could be interested in the Society if the topics of discussion were made as practical as possible. Several new ideas along this line will be tried during the coming winter season, the success of which will be reported at a later date.

H. A. Gilbertson reported that he is making good progress on the history of the Chicago branch which he is writing. Everyone is anxiously waiting for this project to be completed.

Another regular meeting of the Chicago branch was held August 10. The meeting was called to order promptly by **Dr. Russel Harr.** Plans to make our fall and winter technical sessions more interesting and attractive were further discussed at some length. Our librarian, **Scott Modjeska,** reported that arrangements for programs through the month of February have been completed. He also reported that **E. H. McCoy** will discuss the operation of bright copper plating solutions at our September meeting.

The membership committee reported that a membership drive will be under way starting early this fall.

It was the pleasure of those present to celebrate with **Rudy Hazucha** the completion of his 42nd year of perfect attendance at all branch meetings.

J. C. Corre
Publicity Chairman

COLUMBUS

A Film, A Letter, A Talk

The regular monthly meeting of the Columbus branch was held at Battelle Memorial Institute on Friday, September 7, 1956.

Following a film on "Copper Refining" the business meeting was called to order by President **Bill Shriver.**

Bill Neill and **Bill Safranek,** delegates, gave a report on the convention in Washington, D. C.

Walter Denney, member of the permanent Tri-State Committee, reported on the meeting of that committee at the convention in Washington, D. C. He stated that the 1957 Tri-State Regional meeting will be held in Indianapolis next spring.

Nat Koslin told about CTC plans to give a "Technical Man of the Year" award. A motion was made and seconded that the Columbus branch back the CTC on this venture.

President Bill Shriver presented the letter from AES Headquarters about purchasing AES officer's manuals and the matter was turned over to the Board of Managers for further action.

Librarian **George Skelly** introduced the speaker of the evening, **Perry Burnham** of the Hanson-Van Winkle-Munning Co., whose subject was "Engineering in the Plating Room." Burnham discussed full automatic machines, ventilating problems, refrigeration and air agitation of plating baths.

Halvor S. Christianson

INDIANAPOLIS

A Big First Meeting; Rohrabaugh Resigns

The Indianapolis Branch opened its 1956–57 season with a dinner at Fox Steak House with thirty-four members present. The order of business included introductions, reports of the secretary and treasurer, and final report of our annual educational session and dinner dance.

In the absence of **Fritz Anderson,** senior member of the Tri-State organization, **Les Reynolds,** junior member gave a detailed report of the plans for the March 30, 1957 meeting at French Lick Springs Hotel. All committees have been appointed and they are as follows: Reservations and arrangements, Les Reynolds; Publicity, **Edna Rohrabaugh;** Entertainment, **Quentin Shockley;** Tickets, **Bert Hawhee** and **Frank Hartwig;** Printing-Advertising, **Roman Bender;** Men's activities, **Vince Kelly;** Favors, Les Reynolds and Edna Rohrabaugh.

At the national convention in Washington, D. C., a custodian of the funds for the Tri-State was appointed and this is Edna Rohrabaugh of the Indianapolis Branch.

Reports were given on the national convention and **John Holland** gave a report on the business sessions and also about some of the more interesting things that happened.

Back last spring our president asked **Ed Bruck** along with **Al Kriese** to write up the branch history and at this time, Bruck presented this. A copy is spread upon the minutes for further use. The branch extended a hearty vote of thanks to Bruck and Kriese for their work.

Dr. Abe Max reported on the plating school to begin September 27th at the Purdue U Extension Center. About sixty applications have been received and as there is room for about 28, the course will be repeated at a later date if necessary.

Under new business the following were transferred to our branch: **J. A. Hendricks** from Cleveland, **Thomas F. Stapleton** from Detroit, **George S. Johnson** from Dayton.

The present secretary wished to be relieved of the job. A new secretary was chosen by unanimous vote of the branch. He is **Paul B. Freeman.** This was done in a motion by **Herb Kennedy** and seconded by Quentin Shockley. A rising vote of thanks was given to Miss Rohrabaugh for her work for the last four years.

The "Paper" to be written by our branch members is under way and **Dave Sivertsen** accepted chairmanship of the committee. He will report at a later meeting the early results.

We have received a charter from Headquarters in Newark. It will be hung on the wall at the Fox Steak House if possible.

It has been suggested that the branch have a "Sustaining Members" night some time during the year. Ed Bruck informed us that **Herb Head,** National 2nd Vice-President, will be our guest some time during the season and more information about "Sustaining Members" night will be available at that time.

The program for the evening was given by Dr. Max on "Iron Electro-Forming." This was the same as presented at the national convention and proved very interesting.

Edna Rohrabaugh
Secretary

LANCASTER

J. W. Miller Paid Respects

The Lancaster Branch held its first meeting on September 14, 1956. It was an informal dinner meeting held at the Hanover Country Club, York, Pa. **Harry Saylor,** President, presided.

Business of the meeting consisted mainly of the planned programs for the coming year.

Proper respects were observed for the death of the only honorary member of the Lancaster Branch, **J. W. Miller.** He had the first plating shop in the Lancaster area over fifty years ago.

The program consisted of a movie entitled "Metallizing" and a talk by **Chester Smith,** a member of the Branch, on waste disposal for small plating operations in the Lancaster Branch area.

LOS ANGELES

Tony Stabile and George Hetz to Chairman 1960 Convention

The September meeting was held on the 12th at Rodger Young Auditorium with a high attendance of 108 members and guests.

After the preliminary introduction of guests, reading of the minutes and the treasurer's report were given. The newly appointed chairman for the 1957 Annual Education and Dinner-Dance Committee, **Harvey Hunt,** appointed his committeemen off the floor and announced a special meeting for them on September 17th to discuss their duties. First Vice-President **George Magurean,** as Membership Chairman, introduced 12 potential members, all of whose applications would be evaluated by the executive committee for appraisal and action. Six new members were initiated by President **L. Truman Stoner: Dr. Joseph S. Smatko, Andrew A. Carroll, Norman W. Green, Mrs. Vonna F. Ott, Edward L. Riggs, Roy Webb. Stu Krentzel,** as delegate to the June National Convention, gave a report on the campaigning and the success of our delegates in obtaining the 1960 convention for Los Angeles. His report was highlighted by the presentation of an Honorary Member button to **Don Bedwell,** whereupon Bedwell received a large ovation from the membership. **Emmett Babcock,** Librarian and delegate to the June convention, gave a very brief report on the technical sessions of the convention, promising to give us a more detailed report for October.

Under new business, the President announced his appointment for Chairman of the 1960 Convention—**Tony Stabile.** Stabile, in turn, announced his appointment for his co-chairman, **George Hetz.** The President announced the passing away of John Hunter, one of our branch's pioneer members.

The membership was given a personal invitation to attend the National West Coast meeting of A.S.T.M. at the Hotel Statler in Los Angeles during the week of September 16th.

The guest speaker of the evening was **R. C. Barrett,** of Barrett Chemical Products, Shelton, Conn., who talked on "Plating from Sulfamate Baths." Barrett gave a brief history of the sulfamic acid and elaborated on the basic solutions and operating conditions of sulfamate baths with the aid of projected slides.

The meeting was adjourned at 10:40 P.M. by the President.

Frank Virgil
Branch Secretary

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BRANCH NEWS

MELBOURNE

Summer is Winter "Down Under"

The July meeting opened at 7.45 p.m. after a showing of films. President **Littauer,** occupied the chair. **F. Pittard** and **M. Seggie** were admitted and welcomed to the Society by the president. **P. Tikotin,** who had recently visited the Adelaide branch, conveyed the greetings of S.A. members of the Society.

The speaker, **M. Andrews**—managing director of Automatic Plating Equipment Pty. Ltd., was introduced by **K. Howard.** Andrews spoke on "Automation in the Plating Industry." He remarked on the tremendous increase in automatic equipment employed since his first visit overseas in 1945. Automation yields a more uniform product in consistent quantity with less labor and eliminates rack damage, but requires more uniform work, rack loads, etc. since the cost of installation has soared whereas pre-war cost of a plant was greatest on the drawingboard. The various systems, hydraulic, chain, pneumatic, etc., were described and discussed and films were used to illustrate the various aspects.

Question time served to amplify the address. P. Tikotin moved a vote of thanks to the speaker which was carried unanimously.

The August meeting opened at 8 p.m. after a short session of films.

Edward J. Boatwood was admitted. The president remarked on the very interesting visit to the Lewis Berger & Co. Plant.

Glen Walker introduced the speaker, **J. Towner,** general manager of Lewis Berger & Co. Towner opened his address on "The Latest Developments in Organic Coatings in Metal Finishing" with the remark that whilst some may consider organic finishes to compete with electroplating, he considered that they assisted the plating industry by providing a general finish on a car to be adorned by items of electroplate. Today, organic coatings are tailored to the customers requirements. Pretreatment employs alkaline cleaners and detergents as in plating, but then diverges to such preliminaries as phosphate coatings. Priming promotes adhesion to the base metal, fills pores and imperfections and seals against corrosion.

The members' interest in the lecture was evident in a vigorous 40 minutes of questions after which **Don Cam** proposed the vote of thanks to Towner.

NEW HAVEN

Huge Turnout; Korbelak Speaks on Ag, Au, Rh

The first meeting of the fall season was called to order by the President, **Austin Jackson.** The attendance at this meeting was one of the largest we have had in recent years. The roll call of officers was made by the secretary, **B. J. Gaffney.** All present except **L. Roberti,** who is in the hospital. President Jackson appointed his committees for the coming season.

C. Kuster, chairman of the Educational Program, reported on the monthly sessions with all speakers and meetings already scheduled.

Dr. H. Kellner gave a report to the members on the National Convention held at Washington, D. C.

One transfer, from the Newark Branch, and six new members were accepted into the New Haven Branch.

Ed Foley reported on the new educational sessions for platers that will be starting at New Haven College in October. This successful program is run in conjunction with the New Haven AES.

Sal Carreno, the Technical Chairman, introduced the guest speaker of the evening, **Al Korbelak** of Bart-Messing Inc. Korbelak spoke of Electroplating of Silver. In his talk he also mentioned Gold and Rhodium plating in addition to Silver and in conjunction with Silver for use in the Atomic industry.

The door prize was donated by J. B. Stevens Co.

B. J. Gaffney
Secretary-Treasurer

PROVIDENCE-ATTLEBORO

Dr. Lowenheim on Sn and Sn Alloy Plating Opens Active Season

The initial meeting of the 1956–1957 season of the Prov. Attleboro Branch of the AES was held Monday, Sept. 17, at the Providence Engineering Society Building, following a dinner at the Wayland Manor.

Pres. **Sibley Kershaw** called the meeting to order at 8:10 P.M. There were thirty-five enthusiastic members present.

Gerald Noonan, Chairman of the Nominating Committee presented the name of **Thomas Perkins** for the office

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BRANCH NEWS

of Second vice President. Perkins was unanimously elected.

Pres. Kershaw called for a minute of silence by the attending members in memory of: **Dr. Albert Claflin, Edward Garahedian,** and **John Andrews** who have passed away during 1956.

The current officers were introduced by Pres. Kershaw.

John Cahill, Librarian, introduced **Dr. F. A. Lowenheim,** Supervisor Electrochemical Research, Metal & Thermit Corp. Dr. Lowenheim has been responsible for considerable research on Tin-Plating and Tin-Plating Chemicals. He is also the author of many articles, including sections in the Plating Handbook.

Dr. Lowenheim's talk on Tin and Tin-Alloy Plating was very informative and interesting. The alloys discussed were copper-tin, tin-nickel, tin-zinc.

An active question period followed the presentation.

F. L. Sherman
Secretary

SYRACUSE
Plant Trip Opens Season

To open up the fall program of the Syracuse Branch there was a plant trip through the Sanderson-Halcomb Works of Crucible Steel Company of America. This trip was held in the afternoon of September 17, 1956. The Sanderson-Halcomb Works enjoys the distinction of being the finest specialty steel mill in the United States and is the largest single producer of tool steel in the world. On April 5, 1906 the first heat from an electric arc furnace was produced.

Small groups from our society were taken through the melting department, rolling mills, steam hammer and steam press departments, annealing and heat treatment department, bar finishing and inspection department and the wire mill. The plant tour was under the direction of **W. Young,** Metallurgist from Crucible Steel.

At the conclusion of the plant trip there was a short lecture by **J. Marsh,** Chief

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BRANCH NEWS

Metallurgist. Many questions were fired during the talk and were answered at its conclusion.

Milton F. Stevenson
Secretary

TORONTO

Forty-three Attend First Meeting

The first dinner meeting of the Fall season was held by the Toronto Branch at the Royal York Hotel, Friday, September 14. Forty sat down to dinner and forty-three turned out to hear **Ralph E. Pettit,** Technical Advisor to the Metal Finishing Department, Diversey Corporation, Chicago, Illinois; Subject: "Finishing of Aluminum."

Our President-elect, **John Smith,** congratulated Pettit on his fine talk and a lively question period followed.

A. W. Wilson
Librarian

WATERBURY

A First Meeting and An Invitation

The Waterbury Branch held their first meeting on September 13, at the Roger Smith Elton Hotel.

The speaker for the evening was **Harold F. Johnston,** patent attorney for the Scovill Mfg. Co. His subject was "Patents and Their Problems." He discussed the Patents on the Chrome Plating Process and also, the Patent for the Connecticut State License plates.

The New Haven Branch has invited the Waterbury Branch to their October Meeting which will be held at the Mason Laboratory on Hillhouse Ave., Tuesday, October 9, at 8:00 P.M. They will have as their speakers: **Leslie Piddington,** Dalic Metachemical Ltd., Toronto, Canada; **Dennis Hughes,** Metachemical Ltd., London, England; **Marvin Rubinstein,** Marlane Development Co., New York; **Jesse Lane,** Marlane Development Co., New York.

Francis T. Eddy, National First Vice President, was present. His guests were **L. Kingsley Barnes,** Pres. of Westbrook Publishers of Philadelphia; **Richard E. Huntley** formerly Production Manager and Art Director of PLATING, now associated with Westbrook Publishers; and the well-known local Pontiac dealer, **Mr. Seville.**

Nicholas Topazio
Publicity Director

WESTERN ONTARIO

Dr. Taylor on Metal Cleaning; Ladies Night Coming Up

The first meeting of the season of the Western Ontario Branch was held at the William Pitt Hotel in Chatham, Ontario on Sept. 21. Plans were made for our Annual "Ladies Night." This has been a very successful party for the last two years. We are looking forward to a bigger party this time in January.

Our speaker for the meeting was **Dr. Lloyd Taylor,** Director of Research for McDermid Western Inc., Detroit, Mich. He spoke on "Metal Cleaning," particularly Die Castings and Brass. This was a timely subject and the interest shown was certainly indicated by the number of questions asked of the speaker, relative to cleaning.

Earl Patterson
Vice President

AES MEMBERSHIP REPORT

ELECTIONS

Hartford: J. F. Lange
Indianapolis: O. J. Sandrs, Jr.
Newark: E. G. Buckley, T. P. DiSerio, J. Naia, R. F. Walton
Pittsburgh: R. P. Cope, Jr., J. E. Kessler, E. L. Kost, W. M. Lorkovic
St. Joseph Valley: D. B. Bosoarth, G. H. Fetherston, J. V. Lawton, L. J. Lawton, O. R. Mishler, A. J. Seifert
Southeastern: I. G. Florman
Sydney: P. L. Berkelaar, J. H. Crombie, L. H. Goldsboro, R. A. Raine, D. F. Richards
Twin City: J. Batten, C. Emme, R. Ertle, J. MacDonald, C. Martensotto, A. G. Russell, F. E. Walsh
Member-at-Large: P. Bakalinski, New York, N. Y., D. Bridges, Salt Lake City, Utah, R. Seegmiller, Los Alamos, New Mexico

REINSTATEMENTS

Hartford: F. Tarza
Syracuse: J. Benson
Twin City: C. Lewis
Member-at-Large: H. L. Bache, Surrey, England, T. Marlowe, Dunedin, New Zealand

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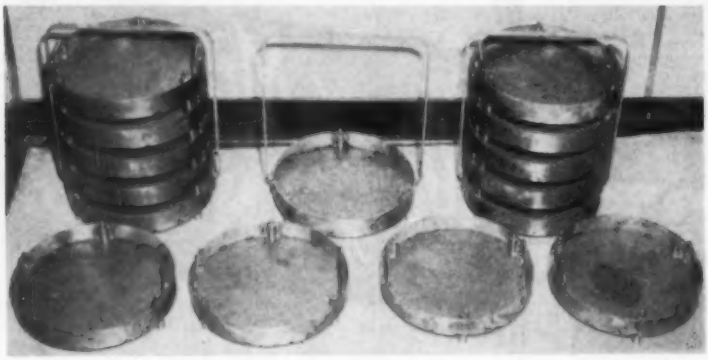

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Hartford: H. Kahler to Detroit
Montreal: N. Gregson to Toronto
Newark: A. H. Szkudlapski from Member-at-Large
Pittsburgh: R. Diaz from Twin City
Waterbury: H. C. Haines to New York
Member-at-Large: A. H. Szkudlapski to Newark

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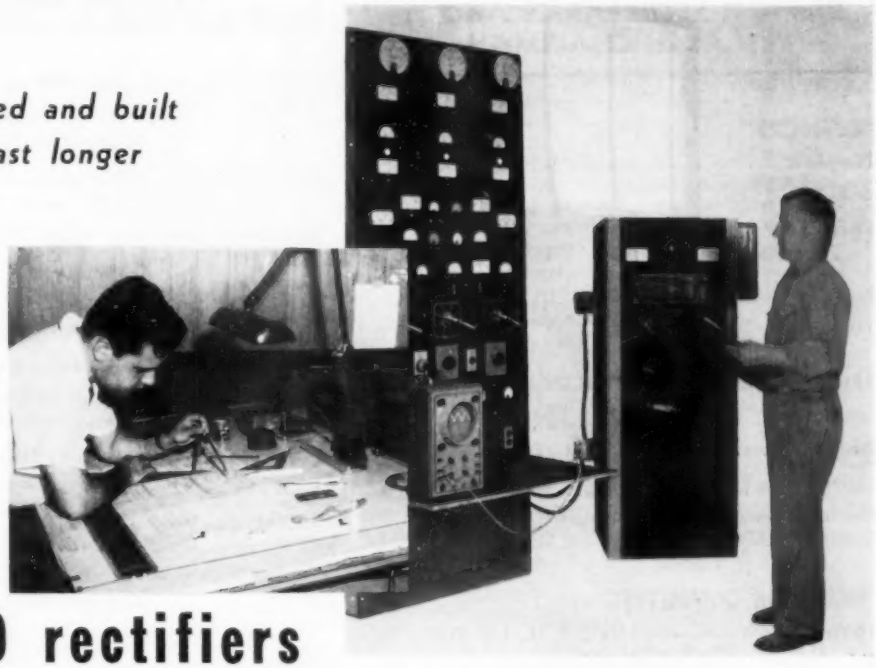

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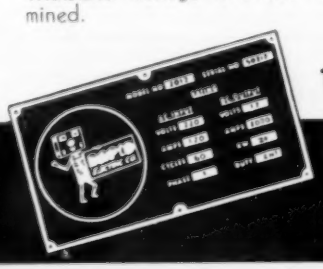

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June 17-20, 1957—44th Annual Convention of the AES, Sheridan-Mt. Royal Hotel, Montreal, Canada.

May 19-22, 1958—45th Annual Convention of the AES, Sheraton-Gibson Hotel, Cincinnati, Ohio.

INTERSOCIETY

October 8-12—National Metal Congress and Exposition, American Society for Metals, Public Auditorium, Cleveland, Ohio.

October 21-24—34th Annual Meeting and 21st Paint Industries Show, Federation of Paint and Varnish Production, Netherlands Plaza Hotel, Cincinnati, Ohio.

October 28-November 1—Fall Meeting, Electrochemical Society, Inc., Hotel Statler, Cleveland, Ohio.

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Only "Help Wanted" and "Situations Wanted" will be accepted. Rates: $.20 per word, minimum $5.00. AES branch members and members-at-large only, in good standing, are entitled to a total of three *free* advertisements in any twelve month period as of first insertion. Last day for inserting advertisements is the 10th of month preceding date of publication. When answering advertisements please address as follows: Box number, PLATING, 445 Broad Street, Newark 2, N. J.

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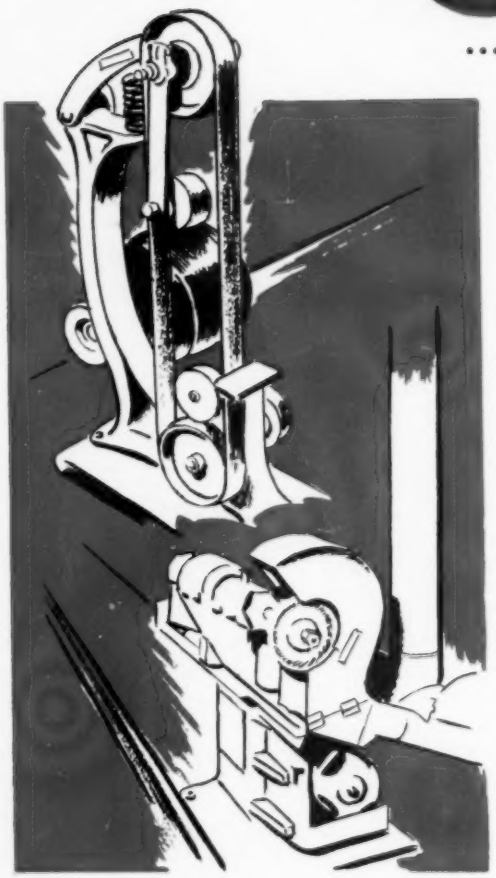

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